E. B. BARBER.

TYPE CASTING MACHINE.

APPLICATION FILED FEB. 13, 1911. RENEWED NOV. 11, 1911.

1,011,558. Patented Dec. 12, 1911.

4 SHEETS—SHEET 1.

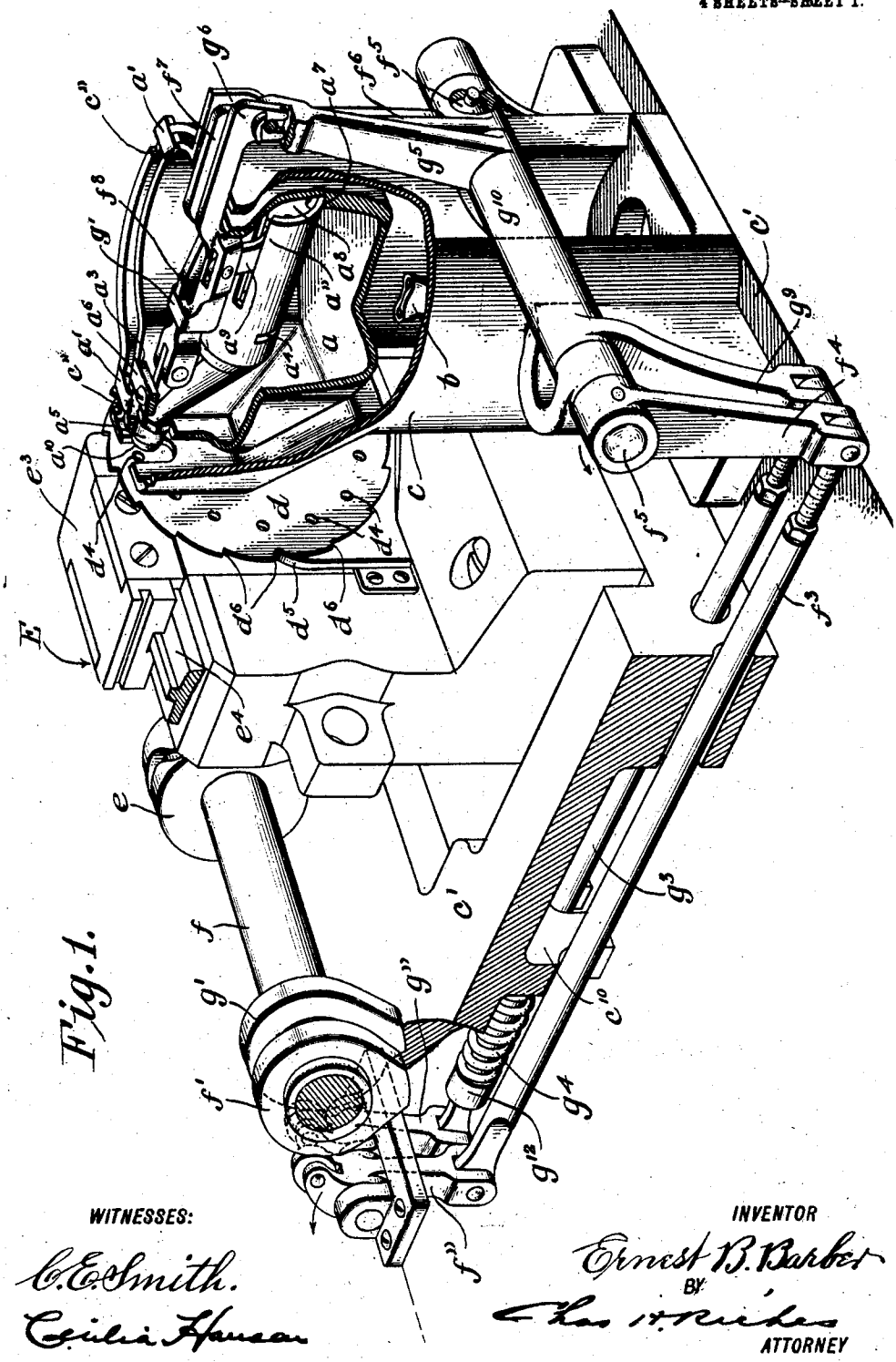

Fig. 1.

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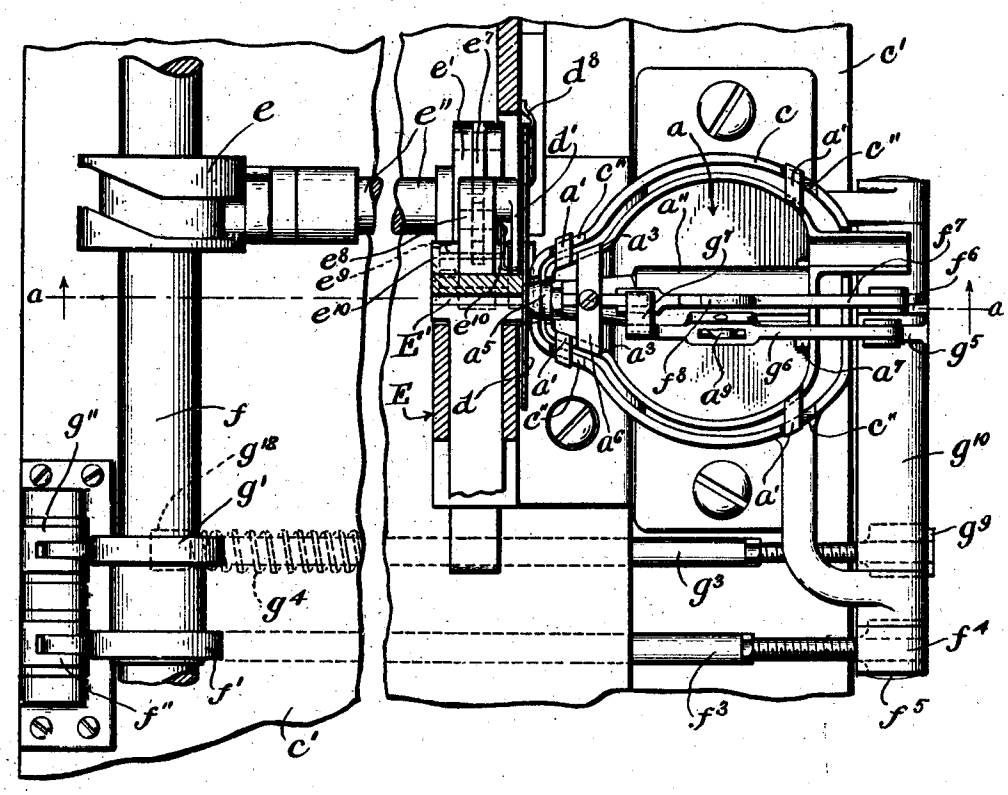
4 SHEETS—SHEET 2.

Fig. 2.



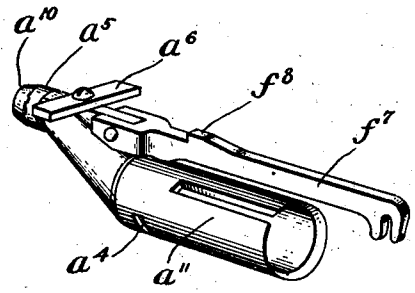


Fig. 4.

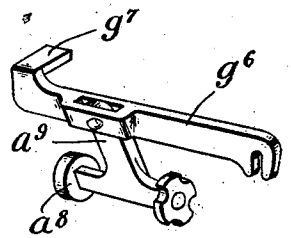


Fig. 3.

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1,011,558. **Patented Dec. 12, 1911.**

4 SHEETS—SHEET 3.

Fig. 6.

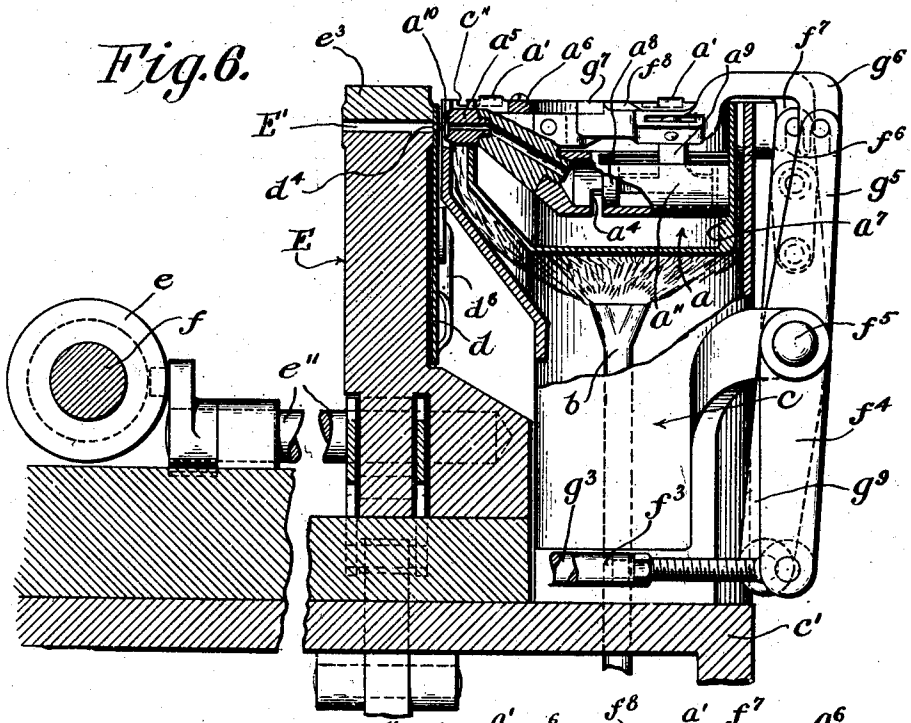
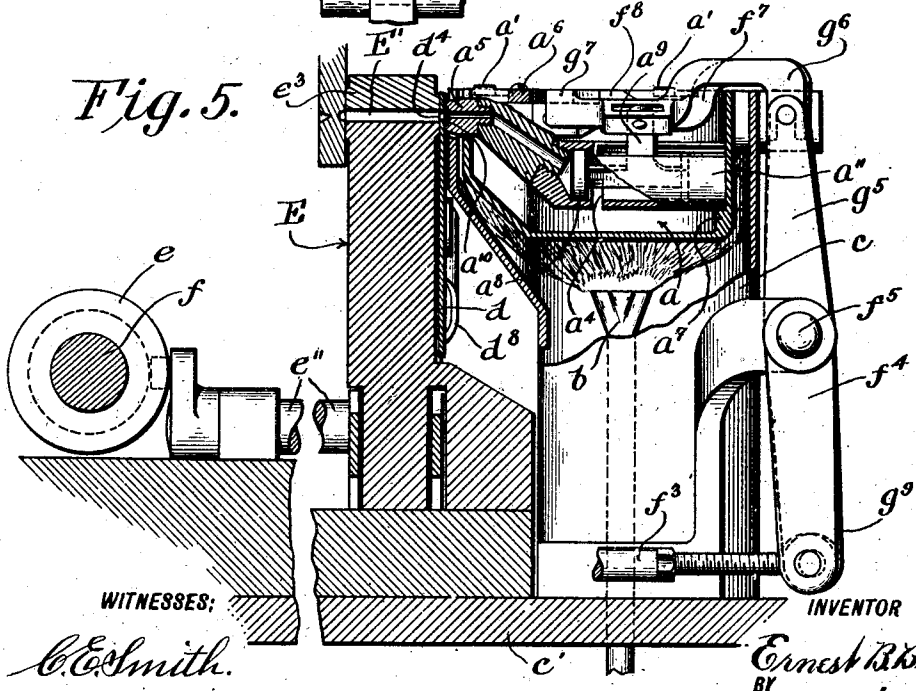


Fig. 5.



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TYPE CASTING MACHINE.

APPLICATION FILED FEB. 13, 1911. RENEWED NOV. 11, 1911.

1,011,558. **Patented Dec. 12, 1911.**

4 SHEETS—SHEET 4.

Fig. 7.

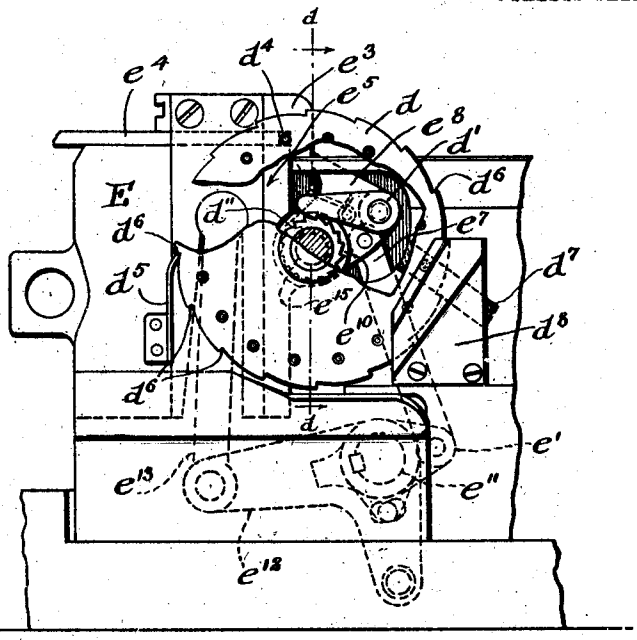


Fig. 8.

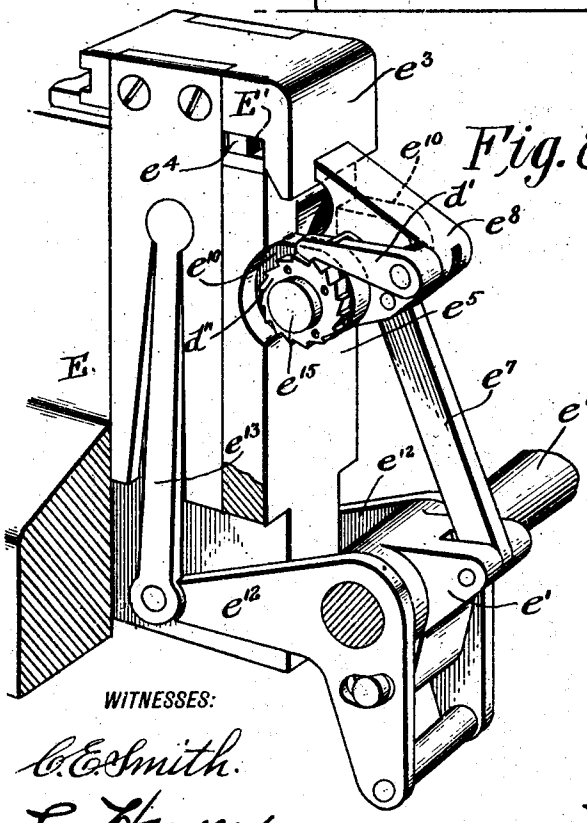
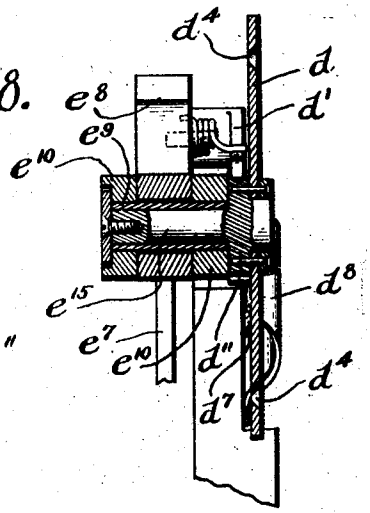


Fig. 9.



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UNITED STATES PATENT OFFICE.

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TYPE-CASTING MACHINE.

1,011,558. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed February 13, 1911, Serial No. 608,440. Renewed November 11, 1911. Serial No. 659,840.

To all whom it may concern:

Be it known that I, ERNEST BENJAMIN BARBER, of the borough of Brooklyn, in the county of Kings and city and State of New York, have invented certain new and useful Improvements in Type-Casting Machines; and I hereby declare that the following is a full, clear, and exact description of the same.

In my application for machines for casting and composing types, filed March 2, 1909, Serial No. 480,828, I have shown and described two melting pots, one a large supply pot from which the molten metal is pumped to the smaller or working pot, both pots being supplied with suitable burners for heating, and means whereby the overflow returns from the working pot to the supply pot, the working pot having a vertical piston well in which, and at proper intervals, the piston ejector descends and displaces a body of molten metal forcing it through the nozzle into the mold cavity. In the same application I have shown and described the type body mold to be provided with a foot plate to form the foot of the type body, this foot plate being attached to the mold structure and provided with an inlet aperture alined with the mold cavity.

In my application Serial No. 564,290, filed May 31, 1910, I have shown and described certain structural changes in the machine forming the subject matter of my said application 480,828, and owing to these and other structural changes to increase the type production, I have redesigned the working melting pot to make it practical for a high speed operating machine, and I have provided the type body mold with a revoluble foot plate having a plural number of inlets successively brought into relation with the mold cavity at each casting operation, cleaned and in condition for the unobstructed flow of the type metal for the cast.

In order to obtain the required rapidity of action I have provided the working melting pot with a horizontally arranged piston well removably suspended in the type metal reservoir in parallel relation to the type body mold and submerged below the level of the type metal with an inlet below the scum surface, and I have arranged the metal reservoir, piston well and piston ejector, within the working melting pot, in such a manner as to be quickly and easily separated, cleaned, and reassembled without disturbing the organization or arrangement of their related parts. I have also provided a positively acting piston ejector and an actuating mechanism causing the piston ejector to reciprocate within the piston well and force a stream of molten metal through the nozzle into the mold cavity at each casting operation, the body of metal displaced by the action of the piston ejector being sufficient only for the casting of the largest type body size. I have also arranged the mouth of the nozzle to form a metal tight joint with the foot plate when the parts are locked in their casting position, and I have formed in the nozzle mouth a chamber to receive the overrun of type metal in casting type bodies of the smaller dimensions. I have also provided actuating means whereby the foot plate is intermittently rotated to bring its inlets successively into position with the mold cavity at each casting operation, and I have provided each inlet with a knife edge to shear off the gate formed by the overrun of type metal, and I have provided means to remove the gate and metal flakes from the foot plate so that each inlet will be brought to exact position with the mold cavity cleaned and in condition for the cast.

For an understanding of my invention reference is to be had to the following description and to the accompanying drawings in which:—

Figure 1, is a perspective view showing the type body mold, the foot plate, the working melting pot and its actuating mechanism; the working melting pot being partly broken away to show its internal construction. Fig. 2, is a plan view partly in section, with the working melting pot and its associated parts locked at their casting position. Fig. 3, is a perspective view of the piston ejector. Fig. 4, is a perspective view of the piston well. Fig. 5, is a vertical section on the line *a*—*a* Fig. 2. Fig. 6, is a similar view to Fig. 5, with the parts in their retracted position. Fig. 7, is a rear view of the mold, the foot plate, and actuating mechanism. Fig. 8, is a perspective view of the parts shown in Fig. 7, with the foot

plate removed. Fig. 9, is a section on the line *d*—*d* Fig. 7.

Like characters of reference refer to like parts throughout the specification and drawings.

The type metal reservoir *a* of the working melting pot is small in comparison to the quantity of type metal used during the operation of a type casting machine and it is to be understood that the reservoir is to be constantly supplied from a larger pot similar to that shown in my said concurrent application 480,828, the type metal in the reservoir being kept in a molten condition, by a burner *b* placed beneath it.

Surrounding the reservoir *a* is a jacket *c* fastened at its base to the main frame *c'* and formed, to direct the heat from the burner around the reservoir *a* and nozzle a^5, and, to prevent the radiation of the heat to the other parts of the machine. The upper edge of the reservoir is provided with outwardly projecting lugs *a'* which slidably rest in the recessed part *c''* of the upper edge of the jacket *c* for the purpose of movably supporting the reservoir within the jacket as hereinafter described. The piston well *a''* is horizontally disposed in the metal reservoir *a* below the normal level of the type metal and has an inlet a^4 below the scum surface for a continuous supply, to the piston well, of molten type metal substantially free from metal dirt and oxid. A cross bar a^6 is fixedly attached to the nozzle a^5 of the piston well *a''* and its ends rest in notches a^3 in the upper edge of the metal reservoir *a*, to removably support the forward part of the piston well in a fixed position with relation to the reservoir. The rear end of the piston well *a''* rests against the inner wall of the reservoir *a* and is removably supported upon a shoulder a^7 provided within the reservoir.

The piston well is provided with a nozzle a^5 projecting through the reservoir and when the parts are in their casting position extends slightly beyond the outer surface of the jacket *c*. The mouth a^{10} of the nozzle a^5 is concaved and forms with the foot plate *d*, when locked up, a metal tight joint around the inlet d^4 to prevent splashing or leakage of the type metal during the cast, the concave formation of the mouth also providing for the overrun of metal. The nozzle a^5 does not, as heretofore been usual, enter the inlet d^4 in the foot plate *d*, but surrounds it when locked up against the face of the foot plate, thus eliminating "binding or hanging" when retracting after the cast and rendering the action of the working melting pot practical for a high speed operating machine.

During the operation of the machine, the working melting pot is moved forward in the jacket *c* until the mouth of the nozzle is locked against the adjacent face of the foot plate *d*, and forms with it a metal tight joint. The piston ejector is then moved forward in the piston well to eject type metal for the cast, the type metal flowing through the mouth of the nozzle, and the positioned inlet d^4, into the mold cavity E', and when the cast is made, the reservoir and its associated parts are retracted from the foot plate.

In order to effect the reciprocating action of the reservoir and its associated parts, I provide the working melting pot with a rock shaft f^5 having a crank arm f^4 to which is connected one end of a link f^3, the other end of the link being connected to the lever *f''* fulcrumed to the main frame *c'*, and actuated by a cam *f'* on the high speed shaft *f*. I also provide the rock shaft f^5 with a crank arm f^6 having its free end connected by a link f^7 with the body part of the piston well *a''*. During the rotation of the high speed shaft *f*, the cam *f'* revolves and moves the upper end of the lever *f''* in the direction indicated by arrow in Fig. 1, moving the lower end of the lever *f''* and link f^3 in the opposite direction. This movement of the link, through the agency of the crank arm f^4, turns the rock shaft f^5 in the direction indicated by arrow in the same figure, and moves the crank arm f^6 toward the working melting pot. This movement of the crank arm f^6, through the agency of the link f^7, pushes the piston well toward the type body mold E. The piston well being stationary in the reservoir *a*, imparts to the reservoir the motion communicated by the crank arm f^6 and link f^7 causing the reservoir to move forward in the jacket *c* to the limit of the movement of the parts, this movement being provided for by the length of the recesses *c''* and determined by the cam *f'* when the mouth of the nozzle has been tightly locked up against the foot plate *d*.

Loosely mounted upon the rock shaft f^5 is a sleeve g^{10} provided with a crank arm g^9 connected by a link g^3 with the lower end of a lever *g''*, the upper end of the lever *g''* being actuated by a cam *g'* mounted on the high speed shaft *f*. The sleeve g^{10} is also provided with a crank arm g^5 connected by a link g^6 with the lug a^9 of the piston ejector a^8. When the mouth of the nozzle is locked against the foot plate, the cam *g'* actuates the lever *g''* to rock the sleeve g^{10} and move the crank arm g^5 and link g^6 toward the type body mold E. This motion of the crank arm and link pushes the piston ejector in the direction of the nozzle of the piston well and causes the ejection of type metal through the nozzle into the mold. Coiled upon the link g^3 is a spring g^4 which effects the return of the parts to their normal position when the lever *g''* is relieved if the influence of the cam *g'*. This spring

g^4 bears against a lug c^{10} forming part of the main frame c' and against a collar g^{12} on the link g^3, forcing the link in the direction of the high speed shaft f. This movement of the link rocks the sleeve g^{10} in the opposite direction to its movement under the influence of the cam g' and reverses the movement of the crank arm g^5 and link g^6 retracting the piston ejector a^8 in the piston well, until the shoulder g^7 comes into engagement with the lug f^8, and by its continued movement restoring the reservoir a to its initial position.

It is through the agency of the parts enumerated that the reservoir and its associated parts are locked in the casting position, and the type metal is ejected from the piston well into the mold cavity, and subsequently returned to their normal or initial position.

The constructive details of the type body mold E are slightly different from those shown in my said concurrent application, but they operate in substantially the same manner.

As the mold forms no part of my present application it will not be necessary to refer to its construction further than to describe the operation of its parts in conjunction with the action of the foot plate and locking member.

Mounted upon the high speed shaft f is a cam e, which, upon each rotation of the cam shaft, causes the oscillation of the rock shaft e'', and through its connections raises and lowers at proper intervals the mold cap e^3. In order to lock the mold parts tightly together during the cast there is rigidly attached to the rock shaft e'' a crank e' connected by a link e^7 with a locking member e^8 which alternately opens from and closes against the mold cap e^3. The locking member e^8 is loosely mounted to rock upon the hollow stationary shaft e^9 supported in lugs e^{10} projecting from the stationary part e^5 of the mold structure, and revolubly within the shaft e^9 is the stud e^{15} of a ratchet wheel d'' intermittently rotated by a spring tensioned ratchet pawl d' pivoted to the locking member e^8. Fixed on the stud e^{15} is the foot plate d having inlets d^4 corresponding in number and pitch with the teeth of the ratchet wheel d'' so that the intermittent rotation of the ratchet wheel will intermittently and successively bring the inlets d^4 into position with the mold E. The edge of the foot plate d is provided with notches d^6 to receive the spring detent d^5, preventing the reverse rotation of the foot plate and holding it in its fixed position until rotated by the action of the ratchet pawl d'. The inlets d^4 are beveled to form knife edges at the inner face of the foot plate, and these knife edges operate to shear off the gates formed on the type.

With each rotation of the high speed shaft f the cam e operates to oscillate the rock shaft e'', the resultant actions of this oscillation being to bring the mold cap e^3 into its closed position against the stationary part e^5 of the mold, through the agency of the cranks e^{12} and links e^{13}, and succeeding the action of closing the mold cap, the crank e' and its link connection e^7 operate to close the locking member e^8 against the mold cap and hold it securely in its closed position during the casting of the type body. Coincident with the closing of the locking member e^8 against the mold cap e^3, the ratchet pawl d' engages a tooth of the ratchet wheel d'' for the next partial rotation of the shaft e^{15} and foot plate d. The cams f' and g' now act simultaneously, the one to move the type metal reservoir a and its associated parts toward the type mold E until the mouth of the nozzle a^5 engages the foot plate d and forms with it a metal tight joint. The cam g' continues its action and causes the intervening parts to force the piston ejector a^8 forward in the piston well a'' to eject a stream of molten type metal through the nozzle a^5 and inlet d^4 into the mold E. The cam g' is so timed that when the ejection of type metal has taken place, it releases the parts and they are then returned to their normal position under the influence of the spring g^4. During the retraction of the parts effected by the spring g^4, the shoulder g^7 of the link connection g^6 comes into contact with an overhanging lug f^8, of the link connection f^7 attached to the body part of the piston well a'', and effects the retraction of the link connection f^7, piston well a'' and metal reservoir a, bringing all the parts back to their normal position. Upon the return of the working melting pot and its related parts to their normal position, the cam e acting upon the rock shaft e'' releases the locking member e^8 from the mold cap e^3, and by its action causes the ratchet pawl d' to rotate the ratchet wheel d'', and foot plate d. During this movement of the foot plate d, the knife edge of the inlet d^4 trims the gate from the type then within the mold E, the gate being carried by the foot plate to a pick d^8 attached to some convenient part of the machine structure, which removes it, this movement of the foot plate also bringing a succeeding inlet d^4 into position with the mold cavity for the next cast. The foot plate revolves between the pick d^8 on one side, and a wiper d^7 on the other side to respectively remove the gates and metal flakes from the foot plate as it revolves so that each inlet d^4 when it passes the pick and wiper will be thoroughly cleaned to provide an unobstructed passage for the type metal into the mold. The mold cap e^3 is then lifted and the type is delivered by the ejector blade e^4 from the mold to the place

of assemblage. The continued action of the parts closes the mold cap against the stationary mold part e^5 and brings the locking member e^8 up to engagement with, but not tightly against, the mold cap.

The special feature of this construction of a working melting pot is that its parts can be quickly and easily detached, separated, cleaned, repaired, reassembled and replaced, and by the arrangement of the piston well in parallel lines with the type chamber, it is possible to provide for the displacement of metal necessary for rapid casting, and to reduce to a minimum the disturbance of the metal ahead of the piston ejector, which, in the present instance, is so slight as not to require any considerable exertion of power or strain of the parts, and by the use of a revoluble foot plate, it is possible to bring to exact position to form the base of the type a foot plate with inlets cleaned and in condition for the cast.

By providing the piston well with a nozzle to deliver the type metal to a type body mold in the same direction as the action of the piston, the displacement of metal by the piston to effect the cast has been so reduced as to increase the rapid operation of the machine.

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

1. In a working melting pot for a type-casting machine, a piston well, and a nozzle for the piston well having a cup-shaped mouth to contain the overrun of metal from the change of type body size.

2. In a working melting pot for a type casting machine, a stationary jacket, a metal reservoir suspended to reciprocate within the jacket, a piston well horizontally and removably supported within the metal reservoir, a piston ejector operating in the piston well, and a nozzle for the piston well to deliver the metal horizontally to a type body mold.

3. In a working melting pot for a type casting machine, a stationary jacket, a metal reservoir supported to reciprocate within the jacket, a piston well horizontally suspended in the metal reservoir, and actuated to cause the metal reservoir to move in a forward direction, a piston ejector operating in the piston well actuated to eject the metal for the cast and to return the metal reservoir with the piston well and piston ejector to their normal position.

4. In a type-casting machine, in combination, a type body mold, and a revoluble foot plate having an inlet with a shearing edge to trim the foot of a type body as the foot plate revolves.

5. In a type-casting machine, in combination, a type body mold, a revoluble foot plate having an inlet with a shearing edge to trim the foot of a type body as the foot plate revolves, and means for bringing the inlet into relation with the type body mold.

6. In a type-casting machine, in combination, a type body mold, a rotatable foot plate having a plural number of inlets with shearing edges to trim the feet of the type bodies as the foot plate rotates, and means for causing the intermittent rotation of the foot plate and bringing the inlets successively into relation with the type body mold.

7. In a type-casting machine, in combination, a type body mold, and a rotatable foot plate having a plural number of inlets successively brought into relation with the type body mold and having shearing edges to trim the feet of the type bodies as the foot plate rotates.

8. In a type-casting machine, in combination, a type body mold, a rotatable foot plate having a plural number of inlets having shearing edges to trim the feet of the type bodies as the foot plate rotates; means for causing the intermittent rotation of the foot plate, and means for cleaning the inlets whereby they are successively brought into relation with the type body mold cleaned and in condition for casting.

9. In a type-casting machine, in combination, a type body mold, a rotatable foot plate having an inlet with a shearing edge to trim the foot of a type body as the foot plate rotates, and means for cleaning the foot plate.

10. In a type-casting machine, in combination, a type body mold, and a rotatable inlet therefor having a shearing edge to trim the foot of a type body, brought during its rotation into operative relation with the type body mold cleaned and in condition for casting.

11. In a working melting pot for a type casting machine a stationary jacket, a metal reservoir movably supported therein, a piston well horizontally supported in and unitedly movable with the metal reservoir, a piston ejector operating in the piston well and operable means causing the movement of the metal reservoir to bring the piston well into operative relation with a type body mold.

Brooklyn, N. Y., January 21st 1911.

ERNEST BENJAMIN BARBER.

Signed in the presence of—

CHAS. H. RICHES,

CECELIA HANSEN.