

No. 867,277.

PATENTED OCT. 1, 1907.

F. A. JOHNSON.  
TYPE CASTING MACHINE.  
APPLICATION FILED NOV. 14, 1898.

7 SHEETS—SHEET 1.

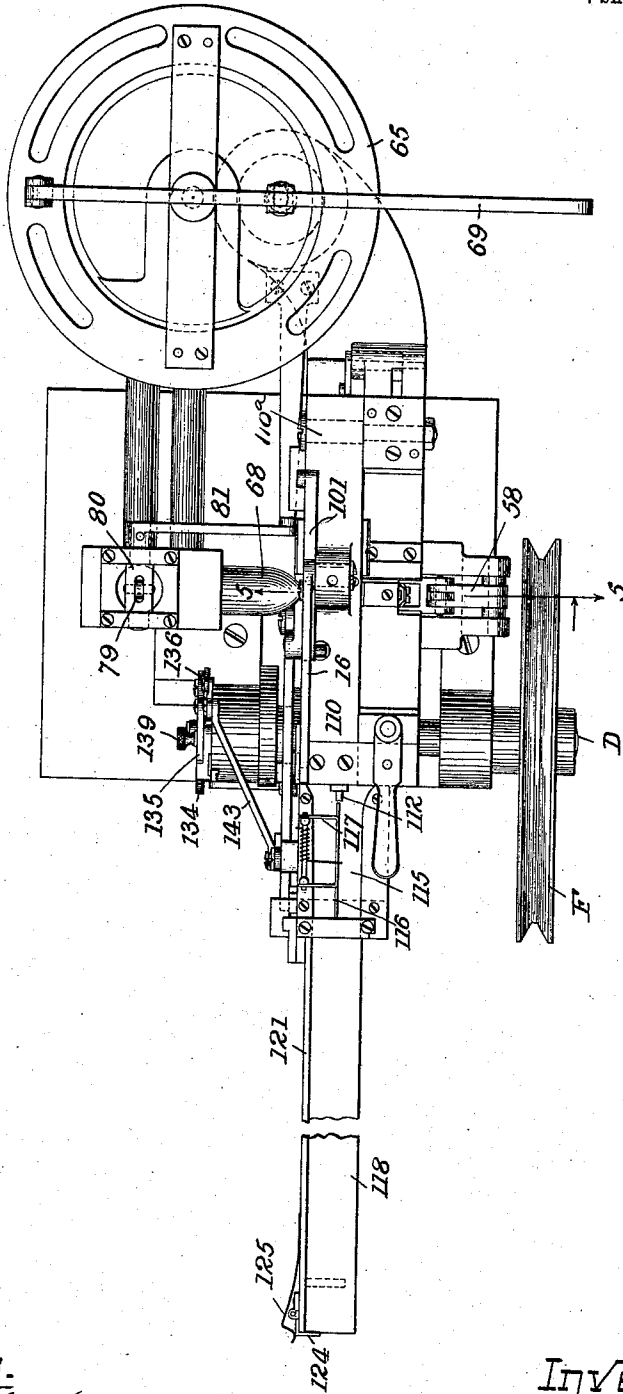


Fig. 1.

Witnesses.

*John F. Nelson*  
*J. F. Hinkel*

Inventor.

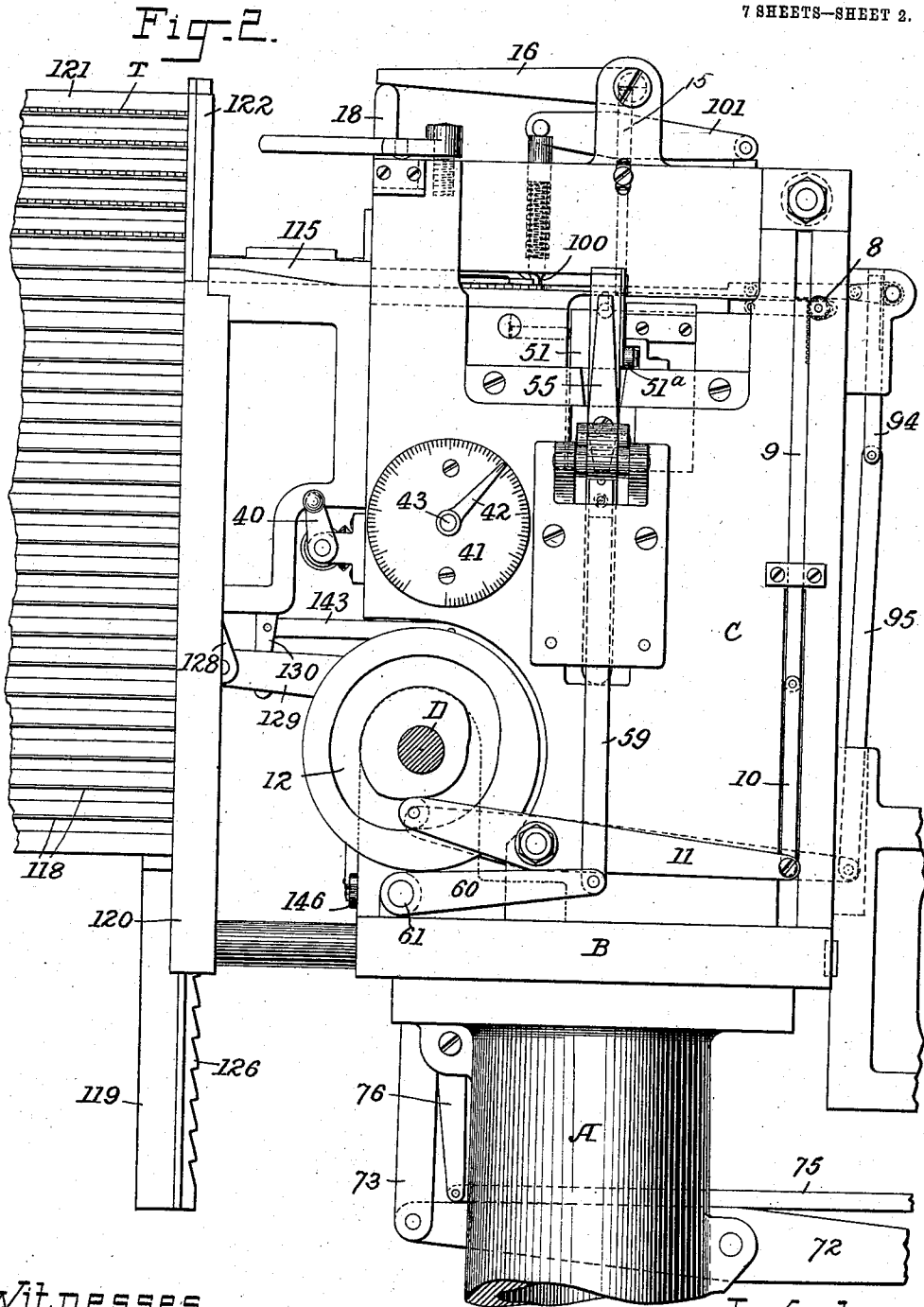
*Frank Amos Johnson*  
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7 SHEETS—SHEET 2.



Witnesses.  
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7 SHEETS—SHEET 3.

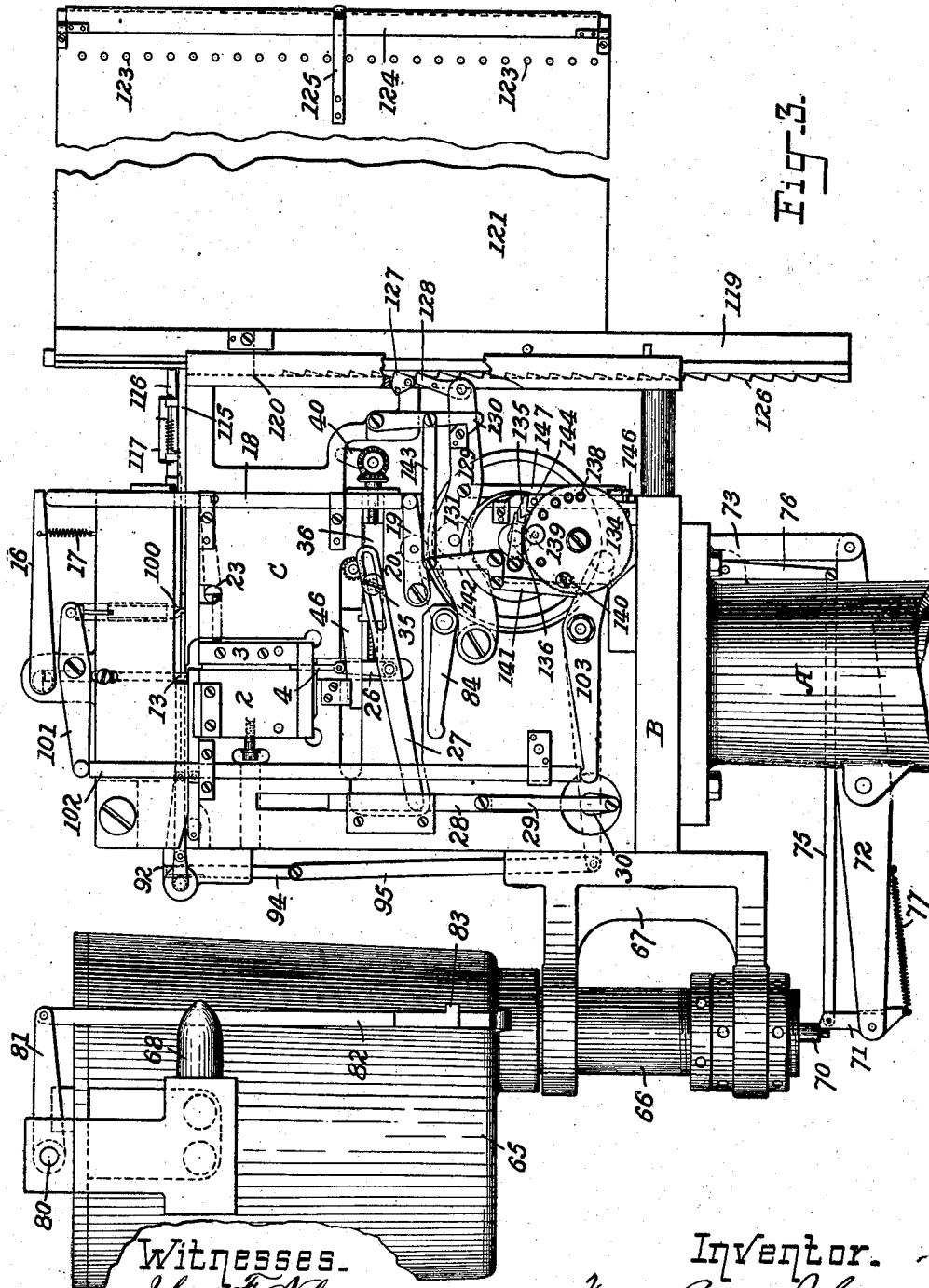


Fig. 3.

Witnesses.  
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7 SHEETS—SHEET 4.

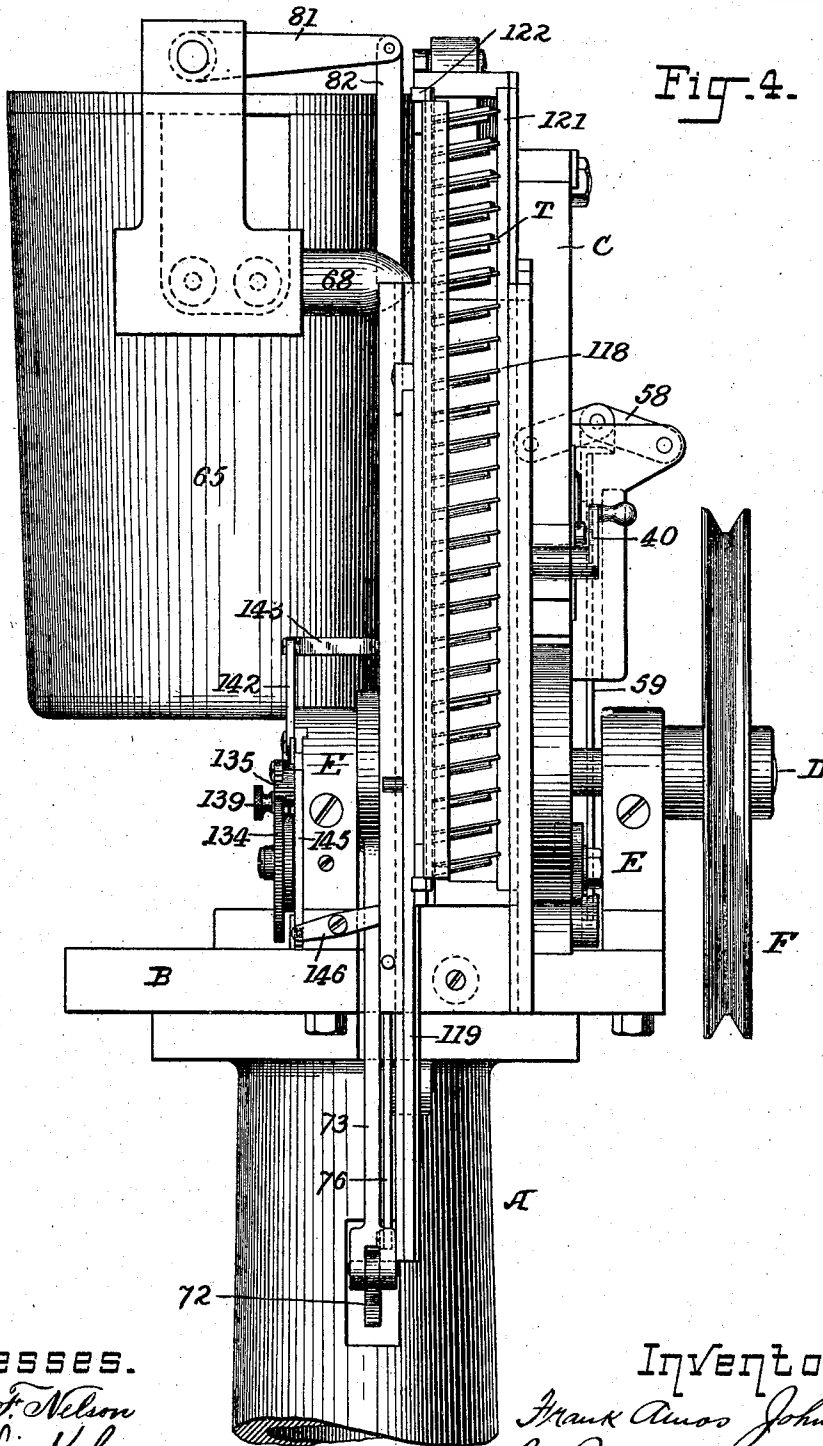


Fig. 4.

Witnesses.  
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7 SHEETS—SHEET 5.

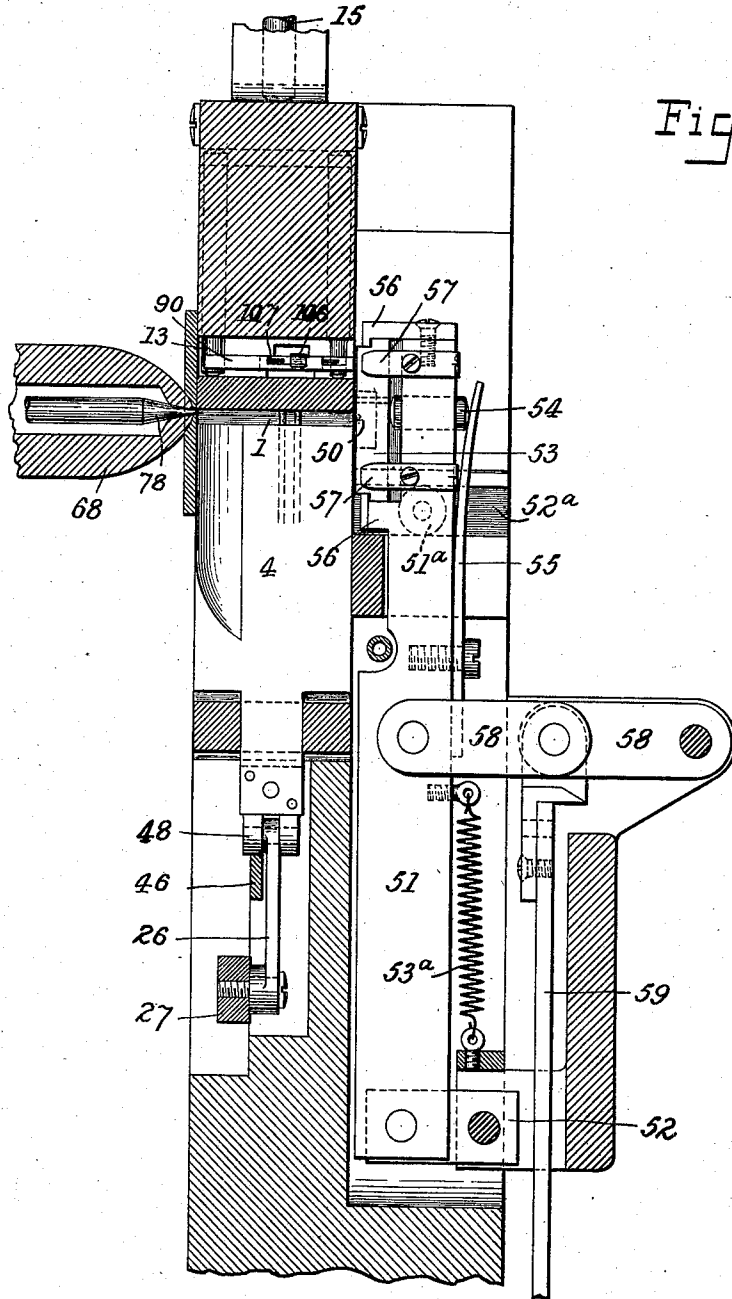


Fig. 5.

Witnesses.

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7 SHEETS—SHEET 6.

Fig. 7.

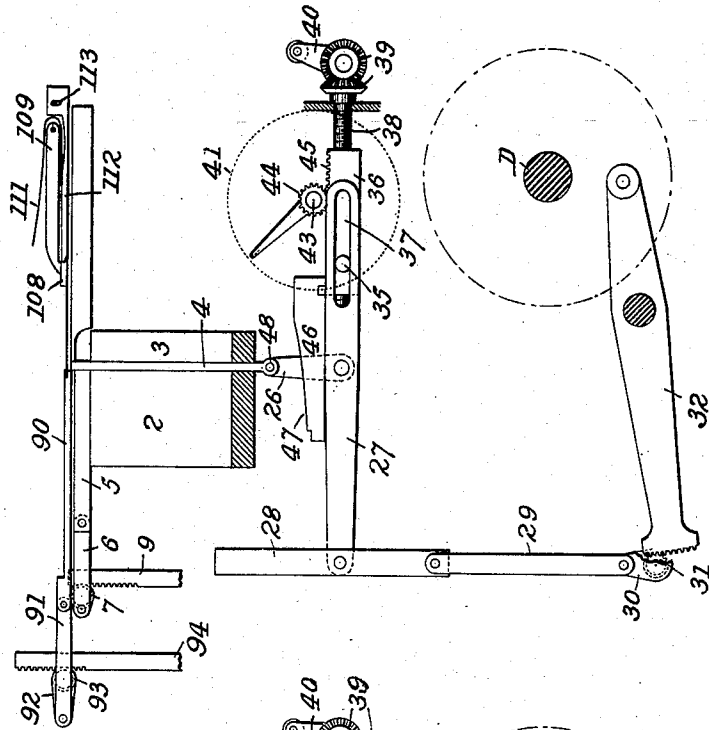
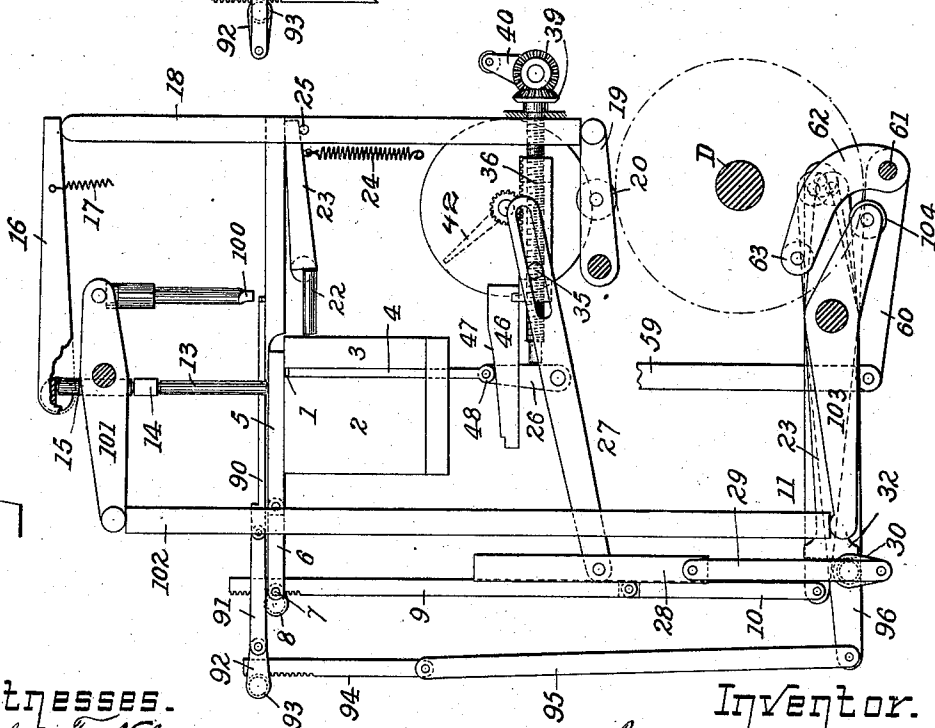


Fig. 6.



Witnesses.

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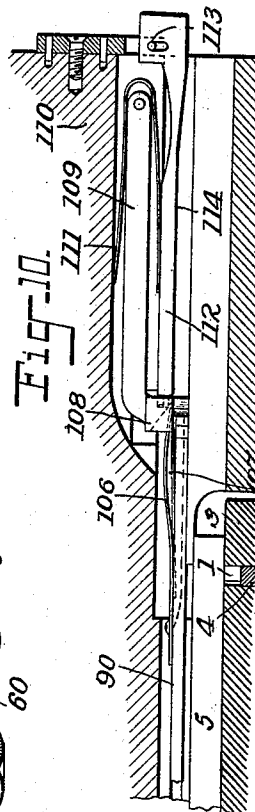
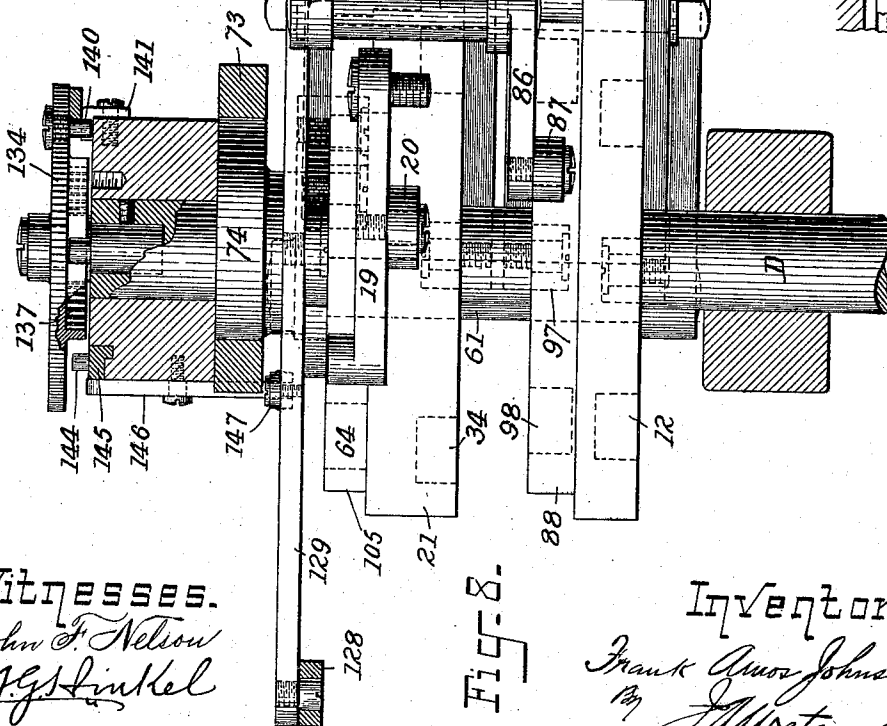
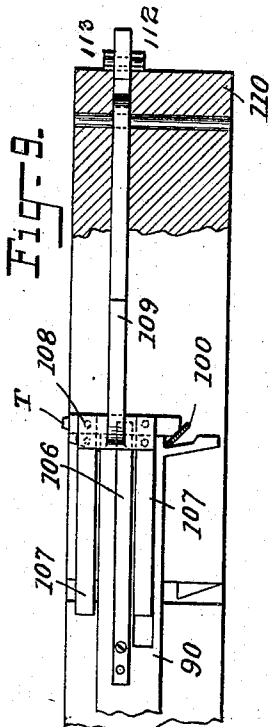
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APPLICATION FILED NOV. 14, 1898.

7 SHEETS—SHEET 7.



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J. G. Stinkkel

Inventor.  
Frank Amos Johnson  
By J. M. Weston atty.

# UNITED STATES PATENT OFFICE.

FRANK AMOS JOHNSON, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITYPE COMPANY, OF MANCHESTER, CONNECTICUT, A CORPORATION OF NEW JERSEY.

## TYPE-CASTING MACHINE.

No. 867,277.

Specification of Letters Patent.

Patented Oct. 1, 1907.

Application filed November 14, 1898. Serial No. 696,419.

To all whom it may concern:

Be it known that I, FRANK AMOS JOHNSON, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Type-Casting Machines, of which the following is a specification.

The object of the present invention is to provide a type casting machine for newspaper and book composing rooms adapted to cast the various type required to supply the type setting machines.

The type casting machine herein described is especially designed to accompany typesetting machines heretofore invented by me, and illustrated, for instance, in U. S. Letters Patent 584,362; issued June 15, 1897, one casting machine being sufficient to furnish type for several of the setting machines, the composed type from the type setting machines being melted and recast instead of being distributed for reuse.

The present invention comprises novel means for setting the mold to cast type of any required body, novel devices for operating the mold and ejecting the type and mechanism for automatically loading the type into trays in which they may be stored and from which they may be delivered directly to the typesetting machines.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a front elevation. Fig. 3 is a rear elevation. Fig. 4 is a left side elevation. Fig. 5 is a partial section about the line 5-5, Fig. 1. Figs. 6 and 7 are skeleton views of parts of the operating mechanism looking from the rear. Fig. 8 is a plan view of the cam shaft and cam levers and Figs. 9 and 10 are plan and side views of the devices for transferring the type from the mold to the trays.

The main frame may be of any design suitable and convenient to sustain the working parts of the machine. As shown it comprises a stand or pedestal A, a base plate B, a vertical plate C and suitable bearings and minor parts to be hereinafter referred to. The mechanism is operated from a cam shaft D which is mounted in suitable brackets E and driven by a pulley F.

One side of the mold 1 is a fixed block 2; the opposite side is a block 3 which is substantially fixed, being capable of yielding slightly under pressure to clamp the body piece 4 which slides between the blocks 2 and 3 and forms the bottom of the mold. The top of the mold consists of a mold slide 5 which moves horizontally on the upper side of the blocks 2 and 3. The mold slide 5 is reciprocated to open and close the mold by means of pitman 6, crank 7, pinion 8, rack 9, connecting rod 10, cam lever 11 and groove cam 12 on shaft D (Figs. 6 and 8). When the mold slide is retracted its end forms

a continuation of the left wall of the mold and a guide for the type ejected from the mold, as shown in Fig. 7. The mold slide is clamped while the metal is being injected into the mold by means of pins 13 (Figs. 3, 5, and 6), cross piece 14, plunger 15 and lever 16, the lever being drawn down by a spring 17. After the type is cast the pressure on the mold slide is released, the lever 16 being raised by means of a slide 18 and cam lever 19, said lever having a roll 20 resting on cam 21. Simultaneously with the clamping of the mold slide, the part 3 is clamped against the body-piece by means of the plunger 22 and lever 23, the latter being drawn down by a spring 24. The lever 23 is raised to release the pressure by a pin 25 on the slide 18 which raises the lever 16.

The body-piece is reciprocated by means of a connecting rod 26, lever 27, slide 28; pitman 29, crank 30, pinion 31 and segment gear 32 on cam lever 33 which is operated by the groove cam 34. The fulcrum of the lever 27 is a pin 35 on a horizontally movable slide 36 (Figs. 3, 6 and 7), the fulcrum pin passing through a slot 37 in the end of the lever. The slide 36 is operated by a screw 38 which is turned by bevel gears 39 and a crank 40. The object of shifting the fulcrum is to vary the lower position of the body-piece and thus vary the width of mold and the size of the type. The body-piece lever 27 is thrown up to the horizontal position at each turn of the cam shaft, as shown in Fig. 7, and the uppermost position of the body-piece is therefore always the same regardless of the position of the fulcrum 35. The lowermost position of the body-piece will vary with the position of the fulcrum, being lowest when the fulcrum is farthest away from the connection 26. The width of the mold opening is indicated on a dial 41 (Figs. 2 and 7) by a pointer 42 carried on a shaft 43 which is turned by a pinion 44 engaging a rack 45 on the fulcrum slide 36. By means of the crank 40 and the dial 41, the mold can be set in a moment for any size of type. To insure the accurate adjustment of the mold and uniformity in the size of type cast while the mold is in any given adjustment I employ a gage piece 46 (Figs. 6 and 7), said gage piece being carried by the fulcrum slide 36. The upper curved edge 47 of the gage piece forms a stop for the lower end 48 of the body piece, as shown in Fig. 6, and the contour of the curve 47 is such that the opening of the mold when the body piece is resting on the gage is exactly the opening indicated on the dial 41. Theoretically the gage piece 46 is not necessary as the position of the fulcrum pin should accurately determine the opening of the mold, but in practice the gage is found desirable to insure correctness should there be any lost motion in the lever 27 due to wear upon the fulcrum pin and other pin con-



nections. The gage piece also forms a positive stop to prevent the pressure of the type metal in the mold from forcing down the body piece. The cam for operating the lever 27 is constructed to throw the crank arm 30 into line with the connecting rod 29 at its upper and lower positions, as shown in Figs. 6 and 7, thus insuring a uniform movement of the free end of the lever 27 and bringing the body piece always to the correct height at the upper extreme of its travel in which position it forms parts of the runway over which the type are transferred.

The matrix 50 is carried by the upper end of matrix-carrier consisting, as shown, of a lever 51 which is pivoted to a link 52 (Fig. 5). As shown the matrix is carried by a block 53 which is spring seated in the upper end of the lever, being pressed forward by a pin or plunger 54 and a spring 55. The block 53 is retained on the lever by hooked arms 56 and guide pieces 57 attached to the lever 51. The lever 51 is moved to and from the mold by toggle links 58 operated by a vertically moving connection 59, arm 60, rock shaft 61 and cam operated arm 62 carrying a cam roll 63 which is driven by a suitable groove cam 64 on the cam shaft, (Figs. 2, 5, 6 and 8). The lever 51 carries a roll 51<sup>a</sup> which runs in a way 52<sup>a</sup> and guides the matrix accurately to the mold. The lever is drawn down constantly by spring 53<sup>a</sup>.

The melting pot, pump and choker may be of the usual type used in type casting machines. In the form shown, which is similar to that illustrated in U. S. Patent No. 533,848, granted to me February 5, 1895, the melting pot 65 is set on a hollow standard 66 which swings in bearings in a bracket 67 to carry the nipple 68 to and from the mold (Figs. 1, 3, 4 and 5). The pump lever 69 is operated by a rod 70 extending down through the hollow standard 66. The rod 70 is raised by a pawl 71 carried on the end of a lever 72 which is operated by an eccentric rod 73 and eccentric 74 on the cam shaft (Figs. 3, 4 and 8). The upper end of the pawl 71 is connected by a link 75 with a cam lever 76, the upper end of which rests on a suitable cam on the cam shaft. The lower end of the pawl is drawn backward to normally hold the upper end of the pawl in line with the rod 70 by means of a spring 77. The pump plunger is raised by the action of the lever 72 until the proper moment for ejecting the type metal at which time the pawl is drawn from under the rod 70 by the link 75 and the pump plunger is brought down by a spring or weight in the usual manner. The choker 78 is operated by an arm 79, rock shaft 80, arm 81 and link 82 carried by the melting pot. The link 82 has a toe 83 which is engaged by an arm 84 on a rock shaft 85 when the nipple is brought up to the mold. The rock shaft 85 is operated by a cam arm 86, roll 87 and cam 88 (Figs. 1, 3, 4 and 8).

After a type is cast it is raised by the body piece 4 until its lower edge is in line with a transfer slide 90, which slide then moves forward carrying the type to a position under the knife or chisel 100 which separates the jet from the type. The slide 90 is operated by a link 91, crank arm 92, pinion 93, rack 94, link 95 and cam lever 96 having a roll 97 which enters a groove cam 98. The crank arm 92 is rotated through an arc of 180 degrees, as shown in Figs. 6 and 7, the link 91 being on the "dead center" at each extreme of the movement of the slide. The slide 90 is therefore always

stopped in exactly the same positions, bringing its end at one extreme to accurately register with the body piece 4 and at the other extreme to register with the knife 100. The knife 100 is operated by a lever 101, slide 102, cam lever 103, roll 104 and cam 105 (Figs. 70 3, 6 and 8).

The transfer slide 90 carries a flat spring 106 which projects over the end of the slide and bears on the type to hold it in position in front of the slide. On opposite sides of the spring 106 are flat springs 107, the right hand ends of which extend over the mold while the left ends are connected to a foot 108 carried by a lever 109 which is pivoted to a cap piece 110. The lever 109 is pressed down by a spring 111. Beneath the lever 109 is a friction piece 112, the right end of which is seated in the foot 108 while the left end has a slot which hangs on a pin 113. The type are carried from the mold to a position under foot 108 and are held by said foot while the knife descends and cuts off the jet. The succeeding types force the line along under the friction piece 112. This piece has its lower edge 114 slightly arched or curved so that it will always bear on the end pieces of a row of type passing under it. The cap piece 110 is hinged to the frame at 110<sup>a</sup> and secured by a catch or lever 110<sup>b</sup>.

As the type leave the friction piece 112 they pass on to a way 115 which has a warped surface designed to turn the type upward at their forward ends as they pass over it to an inclined position which will prevent them from jarring off of the receiving trays which are also inclined. As the type pass over the way 115 they are held from tipping by a friction piece 116 carried by a spring pressed yoke 117, the friction piece being tapered to conform to the way 115 (Figs. 1 and 3).

At the left of the machine is a holder for a series of removable trays, each adapted to receive a long line of type. As shown, the trays 118 are fitted in a frame attached to a slide 119 which is movable vertically in guides 120. The frame comprises a back plate 121, two bars 122 having notches in which the right ends of the trays rest, a series of pins 123 on which the left ends of the trays rest and a hinged keeper 124 extending along the left end of the back plate and adapted to be pressed against the ends of the trays by a spring 125 to hold the trays in position (Figs. 1, 2, 3 and 4).

The slide 119 carrying the trays is provided with a rack 126 which is engaged by a retaining pawl 127 and periodically raised by a lifting pawl 128 as the trays are filled to bring empty trays into position to receive type. The lifting pawl is carried by a lever 129 which is normally held in its elevated position by a hook 130 (Fig. 3). When a tray is filled the hook 130 is withdrawn and a cam roll 131 is permitted to drop on to a cam on the shaft D and at the succeeding revolution of the cam the lever 129 is raised carrying the rack 126 up one notch, the lever being again locked in its upper position by the hook 130.

As shown, the following devices are employed for periodically releasing the hook 130. A ratchet wheel 134 is arranged to be moved by a pawl 135 operated by an eccentric pin on the end of the cam shaft. The ratchet wheel is held by the holding pawl 136 against the tension of the return spring 137 (Figs. 3 and 8). In the ratchet wheel are a series of holes 138, in any one of which a movable pin 139 may be placed. A

second pin 140 rests against a projection on a slide 141 when the ratchet wheel is in its initial position, as shown in Fig. 3. As the cam shaft rotates and the type are cast successively the ratchet wheel is moved  
 5 by the pawls until the pin 139 comes under and lifts the slide 141. This, in turn, rocks the elbow lever 142 which is connected by link 143 with the latch 130. The lever 129 is thereby released and dropped. During the succeeding revolution of the cam shaft lever  
 10 129 is raised carrying with it the tray frame. As the lever falls the pawls 135, 136 are raised by a pin 144 on a slide 145, which slide is operated by a lever 146 connected to lever 129 by a link 147 (Figs. 3 and 4). When the pawls 135, 136 are raised the spring 137 immediately returns the ratchet wheel to its initial position and the pin 140 draws down the slide 141, thereby drawing the latch over into position to engage the lever 129 when it is raised by the cam. The position of the pin 139 is determined by the size of type being  
 20 cast. The larger sizes, of course, require that the tray frame should be lifted oftener than when smaller sizes are being cast. The holes in ratchet wheel 134 can be marked to correspond with the mold sizes indicated on the dial 41.

25 The operation of the machine will be obvious from the preceding description and need only be briefly referred to. A matrix for the letter to be cast is secured to the lever 51 and the crank 40 is turned until the pointer 42 indicates the proper body width of the letter on the dial. The fulcrum 35 and the gage 46 are  
 30 thus set to control the opening of the mold suitable to said body width. Previous to starting the machine the pin 139 is also set in the ratchet wheel 34 to correspond with the body width of the letter. The machine being thus adjusted and started type of the required size and kind will be cast and delivered to the trays in the tray holder. Each type is raised by the body piece until it comes opposite the transfer slide  
 35 90 and under the spring 106. The slide then advancing carries the type T with the jet adhering to it over to the knife 100 as seen in Fig. 6 and 8. In this position it is held by the presser foot 108 while the knife descending cuts off the jet. The type remains in this position until it is forced from under the pressure foot  
 40 by the succeeding type after another cycle of operations. A line of type is thus assembled under the friction piece 112, and as the line moves forward the type are pushed over the warped runway 115 to the tray which happens to be opposite the said runway.

45 It will be noticed that the type are held frictionally against the runways from the time they leave the mold until they reach the trays. The trays are inclined backward and the type have therefore no tendency to fall off. The springs 107 overlap the mold and always  
 50 bear on the type while it is being transferred by the slide 90. These springs being connected to the presser foot 108 guide the type under the presser foot regardless of the size of the former. The forward end of the friction piece 112 has some vertical play in the presser  
 55 foot 108 so that it can drop down and engage a small type while a larger type is under the presser foot. The forward end of the piece 112 is beveled to permit the large type to raise and pass under it. The tray frame or rack is set at the beginning of operations with the  
 60 upper tray on a level with the mold and runways. As

each tray becomes filled the shifting devices come into operation and raise the tray frame until the next lower tray is opposite the runways.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. In a type casting machine, in combination, a mold, a movable body piece therefor, a lever connected with the body piece and a movable fulcrum for the lever whereby the opening of the mold may be adjusted, substantially as described. 70
2. In a type casting machine, in combination, a mold, a movable body piece therefor, a lever connected with the body piece and arranged to move the same, a movable fulcrum for the lever whereby the movement of the body piece is varied, and a gage connected with the movable fulcrum and forming a positive stop for the body piece, substantially as described. 75
3. In a type casting machine, in combination, a mold, a movable body piece therefor, a lever having its middle portion connected with the body piece, means for swinging one end of said lever a constant distance, and a movable fulcrum for the other end of said lever whereby the movement of the body piece and the opening of the mold may be varied, substantially as described. 80
4. In a type casting machine, in combination, a mold, a movable body piece therefor, a lever connected to the body piece, and a fulcrum for said lever movable at right angles to the line of movement of the body piece to vary the mold opening as the lever assumes its last position, said lever in its uppermost position being always at right angles to the said body piece whereby the uppermost position of the body piece is not varied, substantially as described. 85
5. In a type casting machine, the combination of the mold, the movable body piece therefor, the lever connected to the body piece, means for imparting constant movement to one end of said lever, a movable fulcrum for the other end of said lever, means for moving the fulcrum, and a dial and index connected with the fulcrum and adapted to indicate the mold opening, substantially as described. 90
6. In a type casting machine, a mold comprising two sides, a movable body piece forming the bottom of the mold, and a mold slide closing the top of the mold, in combination with a reciprocating transfer slide above said mold slide, substantially as described. 95
7. In a type casting machine, the mold having one end closed by a mold slide, and a body piece adapted to eject the type from the mold and carry it above the mold slide, in combination with a knife for severing the jet from the type and a transfer slide above the mold slide and adapted to carry the type from the body piece to a position under the jet knife, substantially as described. 100
8. In a type casting machine, the combination, with the mold, a mold slide therefor, means for ejecting the type from the mold and conveying it above the mold slide, a movable jet-knife, a presser foot for holding the type in position under said knife, a transfer slide above the mold slide, and means for operating the transfer slide to carry the ejected type from the mold to a position under said presser foot, said means also operating to cause the transfer slide to register exactly with the jet-knife, substantially as described. 105
9. In a type casting machine, in combination, the mold and jet knife, the transfer slide cooperating with the mold and the jet knife, the crank and connecting link for operating said slide, and means for swinging said crank through 180 degrees and stopping the same in line with the connecting link at each extreme of its movement whereby the transfer slide is caused to register exactly with the mold and the jet knife, substantially as described. 110
10. In a type casting machine, means for delivering the type from the mold comprising a transfer slide, a type-holding spring connected to said slide, a spring presser foot having friction springs 107 connected thereto, and a friction piece 112 in the rear of the presser foot, said presser foot being adapted to hold the type temporarily while the jet is cut off, substantially as described. 115
11. In a type casting machine, the combination of the presser foot lever, the presser foot, and the spring therefor, with the friction piece having one end interlocked with the

presser foot and the other end movable to and from the runway and the spring pressing said friction piece toward the runway, substantially as described.

12. In a type casting machine, the combination with a  
5 runway, of a spring pressed friction piece overlying the runway, the lower edge of said piece being concavely curved whereby its pressure is brought to bear on the end types of a line passing under it, substantially as described.
13. In a type casting machine, in combination, a mold, a  
10 movable body piece therefor, a lever connected with the body piece, means for adjusting the movement of the lever for varying the opening of the mold, and a gage adjusted with the lever and forming a positive stop for the body piece, substantially as described.
14. The combination with a type casting machine hav-  
15 ing a delivery runway, of a vertically movable series of type line holders, devices for counting the type delivered to each holder, means for shifting the holders periodically, said means being controlled by the counting devices, where-  
20 by the holders are shifted as they become filled and empty holders substituted therefor, and means for adjusting the counting mechanism for different sizes of type, substantially as described.
15. The combination with a type casting machine hav-  
25 ing a melting pot, a mold, means for ejecting the type, and a power shaft for operating the mold and ejecting mechanism, of a movable series of type line holders, means for moving the type from the mold into said holders successively, devices operated by the aforesaid shaft for  
30 counting the type delivered to each holder, and means controlled by said devices for shifting the holders periodically, substantially as described.

16. The combination with a movable tray frame having supports for holding the trays in an inclined position, of a warped runway having one end horizontal and the other end inclined to register with the trays, and a suitable friction piece over said runway, substantially as described. 35

17. The combination with a type casting machine having a delivery runway, of a vertically movable series of type-  
40 line holders, devices for counting the type delivered to each holder and means for shifting the holders periodically, said means being controlled by the counting devices where- by the holders are shifted as they become filled and empty holders substituted therefor, substantially as described.

18. The combination with a movable type-line holder, 45 and a rotating shaft, of a rack upon said holder, a pawl for operating the rack, a latch normally holding the pawl in an elevated position, a ratchet wheel, a pawl connected with the shaft for moving the ratchet wheel, an adjustable pin or projection upon said ratchet wheel arranged to re-  
50 lease the latch when the wheel has been rotated a predetermined amount, a cam on the shaft adapted to operate the line holder lifting pawl when the latter is released from the latch, and means for automatically returning the ratchet wheel to its initial position each time the line  
55 holder is shifted, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

FRANK AMOS JOHNSON.

Witnesses:

REBECCA W. HATHAWAY,  
WM. F. CASWELL.