7 Sheets--Sheet 1.

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

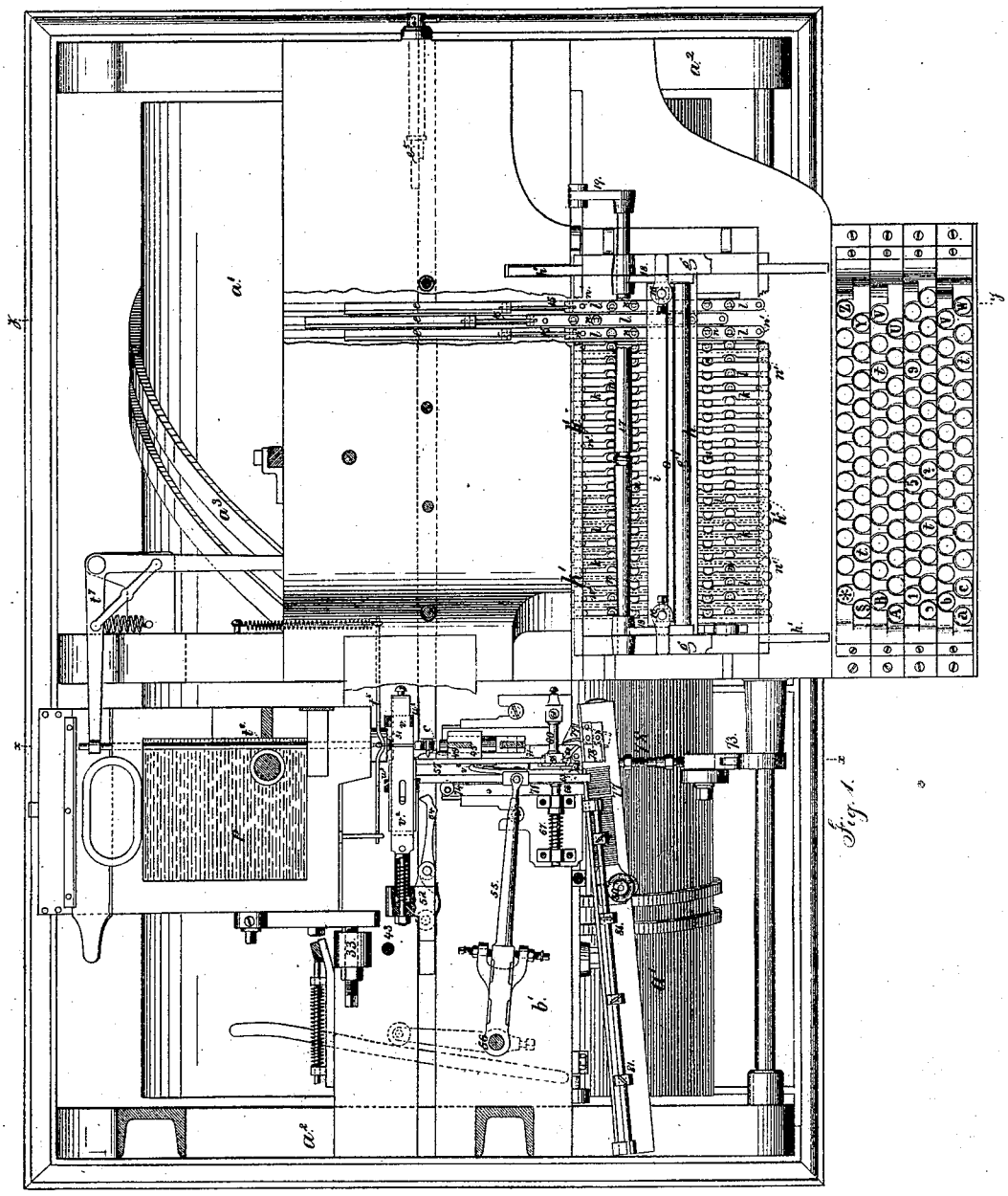


Fig. 1.

Witnesses,

Chas. H. Smith

Harold Serrell

Inventor,

Charles S. Westcott.

per Lemuel W. Serrell

Atty

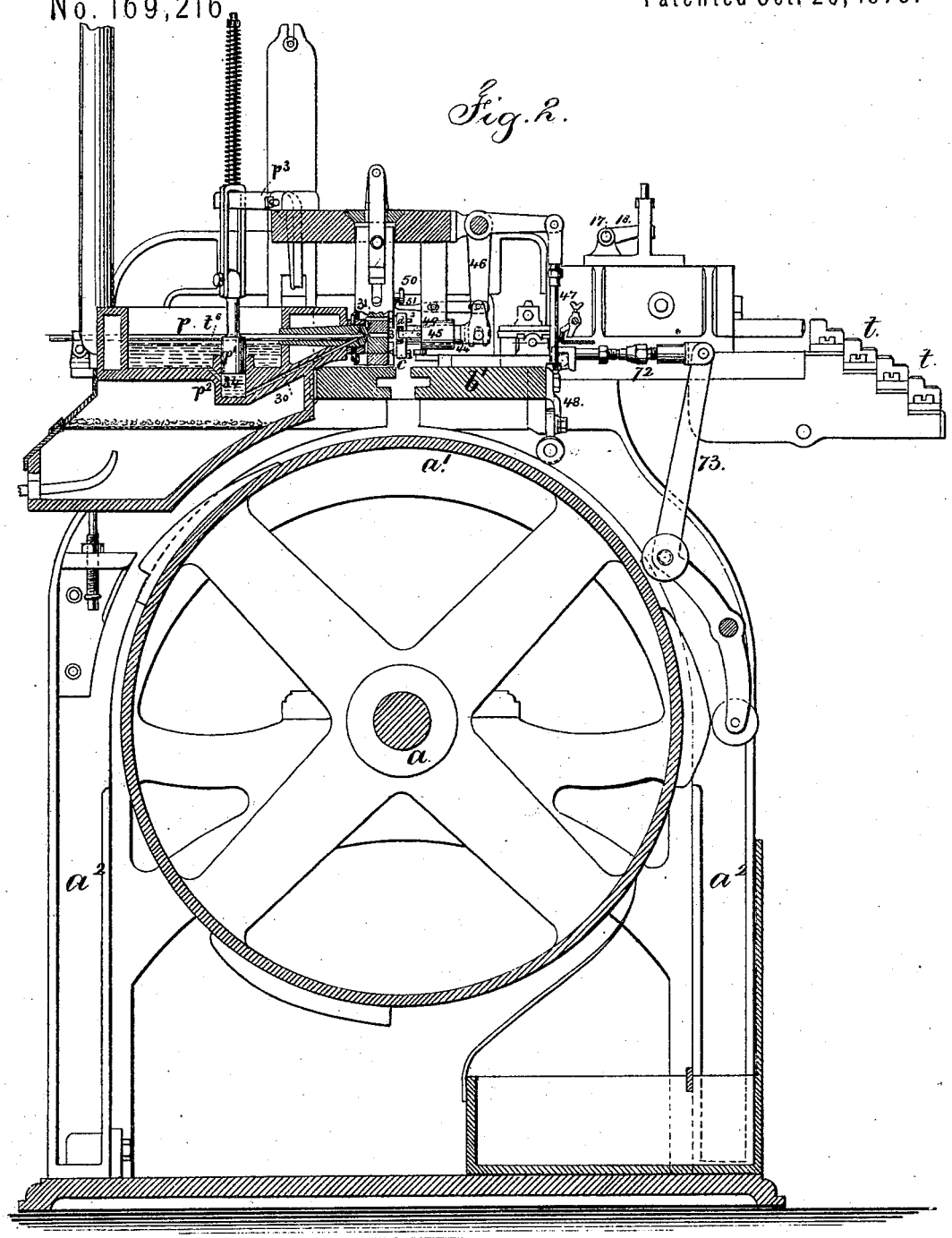
7 Sheets--Sheet 2.

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

Fig. 2.



Witnesses
Chas. H. Smith
Harold Serrell

Inventor
Charles S. Westcott.
per Lemuel W. Serrell
Atty.

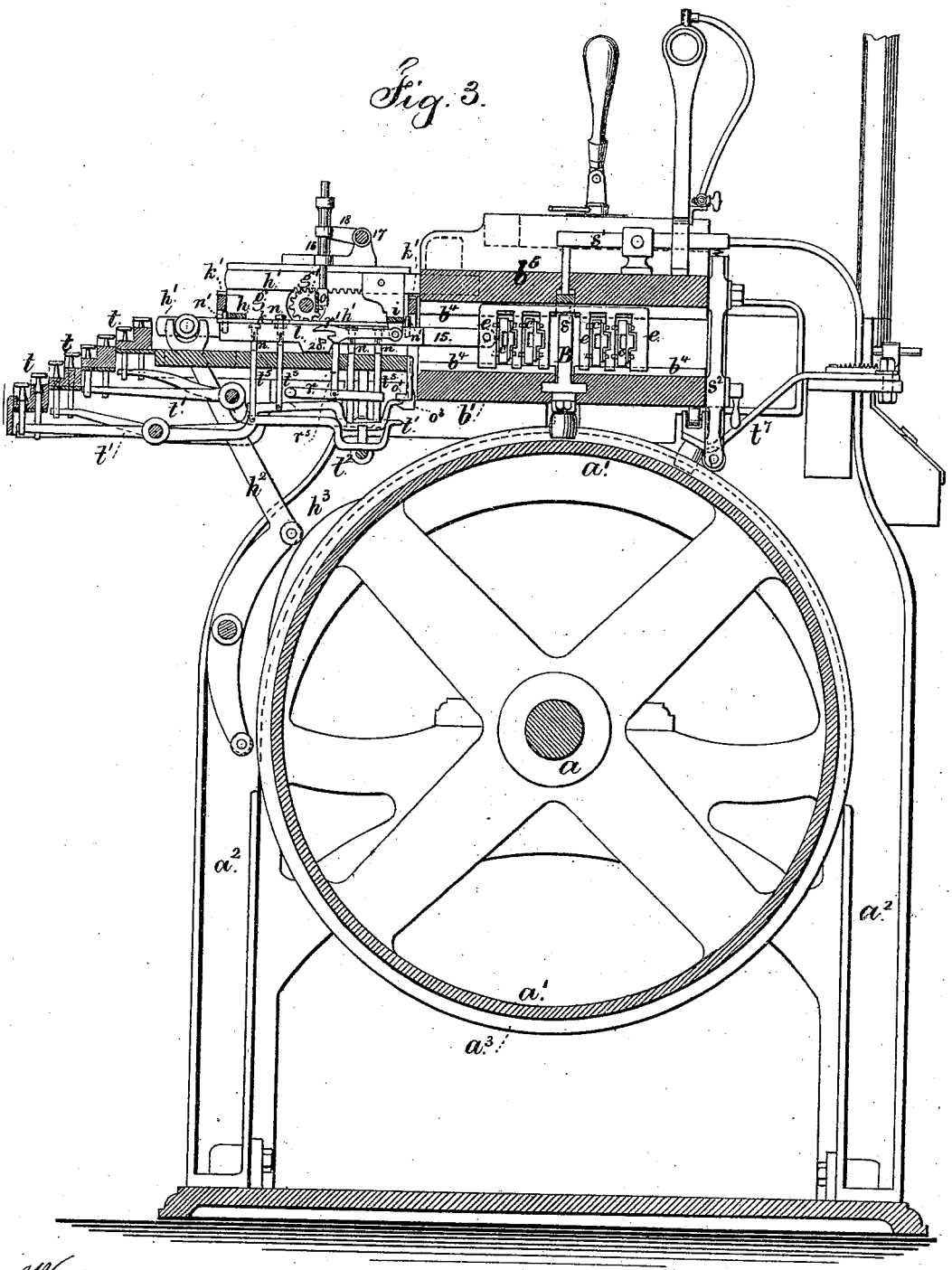
7 Sheets--Sheet 3.

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

Fig. 3.



Witnesses

Chas. H. Smith

Harold Serrell

Inventor

Charles S. Westcott.

per Lemuel W. Serrell

Atty

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

Fig: 15.

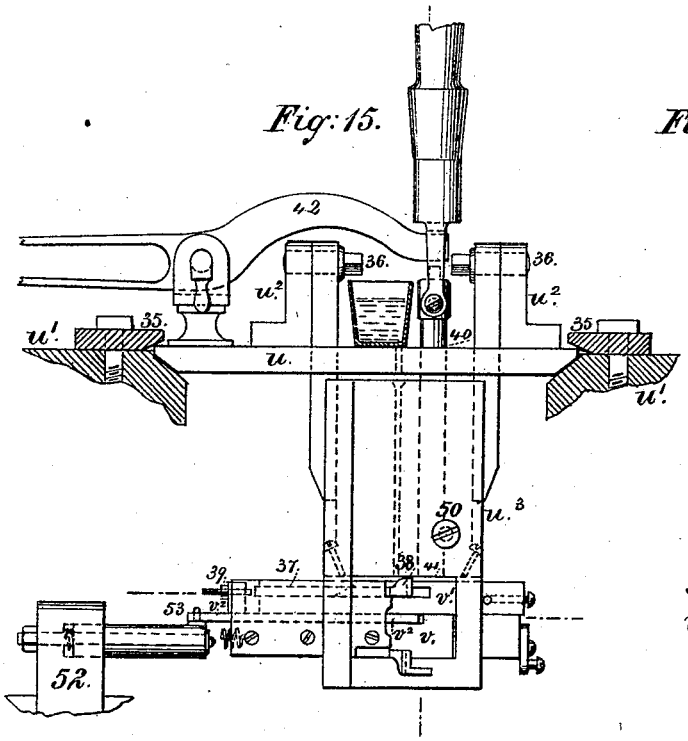


Fig: 17.

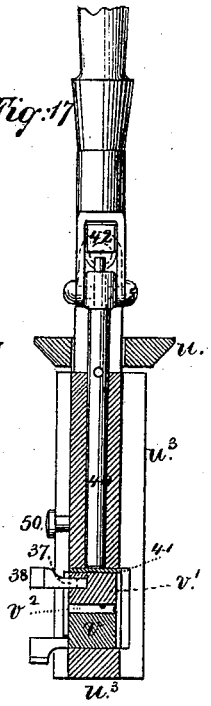


Fig: 16.

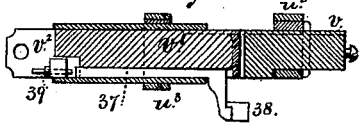


Fig: 22.

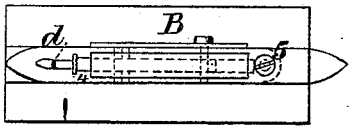


Fig: 6.

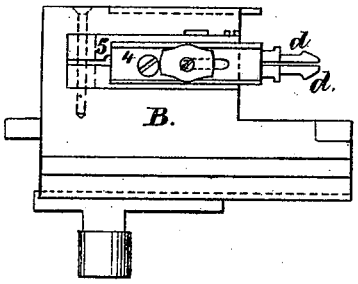


Fig: 7

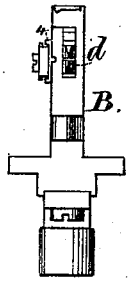
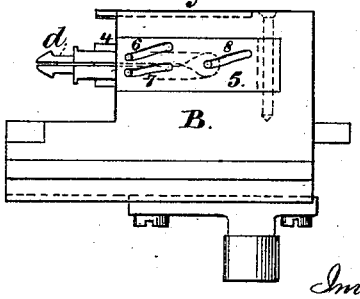


Fig: 5



Witnesses

Chas. H. Smith

Harold Serrell

Inventor

Charles S. Westcott.

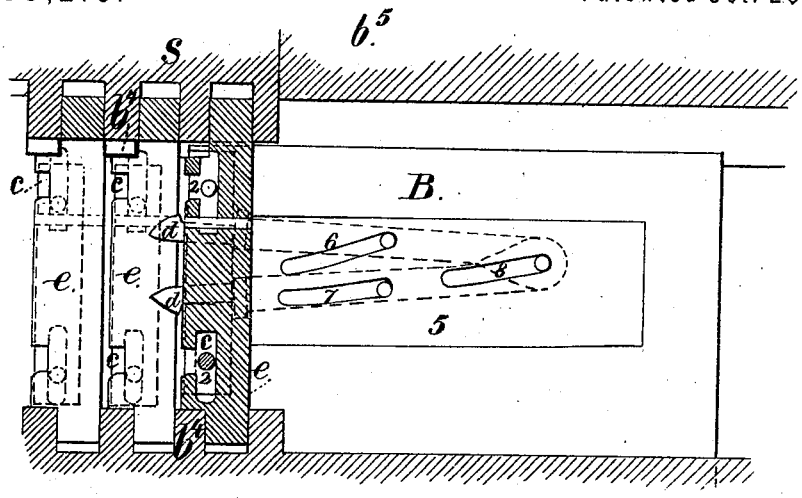
per Lemuel W. Serrell Atty

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

Fig. 4.



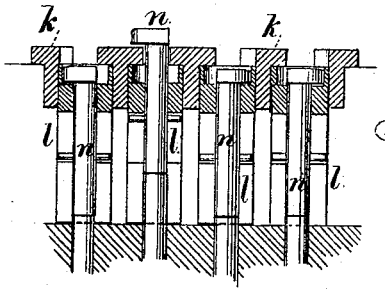


Fig. 10.

Fig. 14.

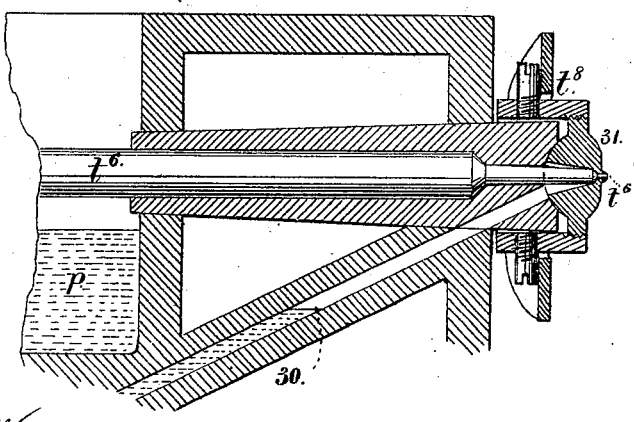


Fig. 9.

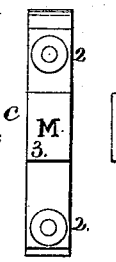
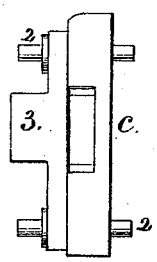


Fig. 8.



Witnesses

Chas. N. Smith

Harold Serrell

Inventor

Charles S. Westcott.

per Lemuel W. Serrell

Atty

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

Fig. 18.

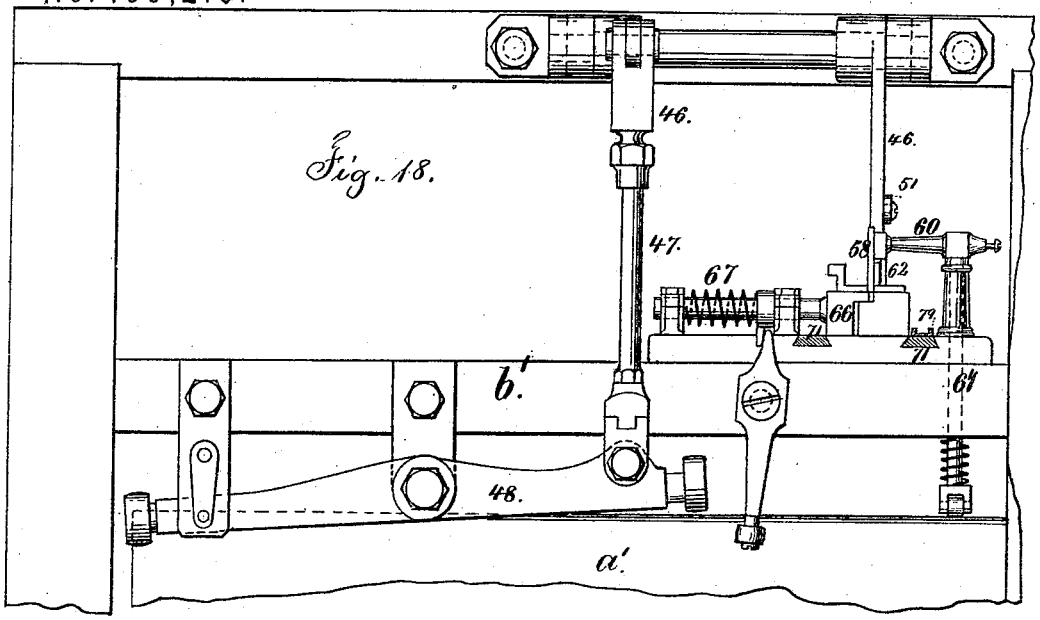


Fig. 11.

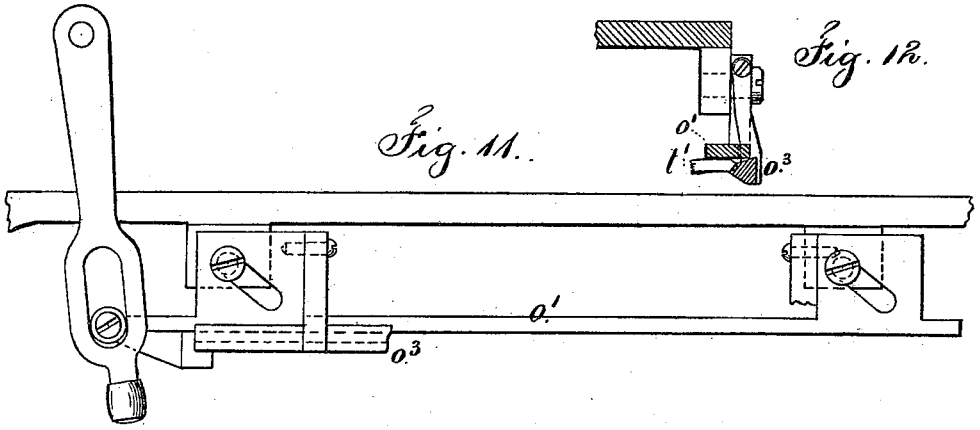
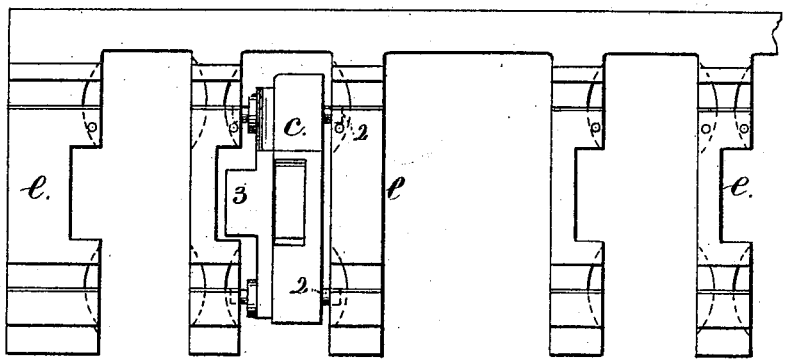


Fig. 12.

Fig. 23.



Witnesses
Chas. H. Smith
Harold Serrell

Inventor
Charles S. Westcott.
per Lemuel W. Serrell
atty

C. S. WESTCOTT.

Type-Casting and Setting-Machines.

No. 169,216. Patented Oct. 26, 1875.

Fig. 19.

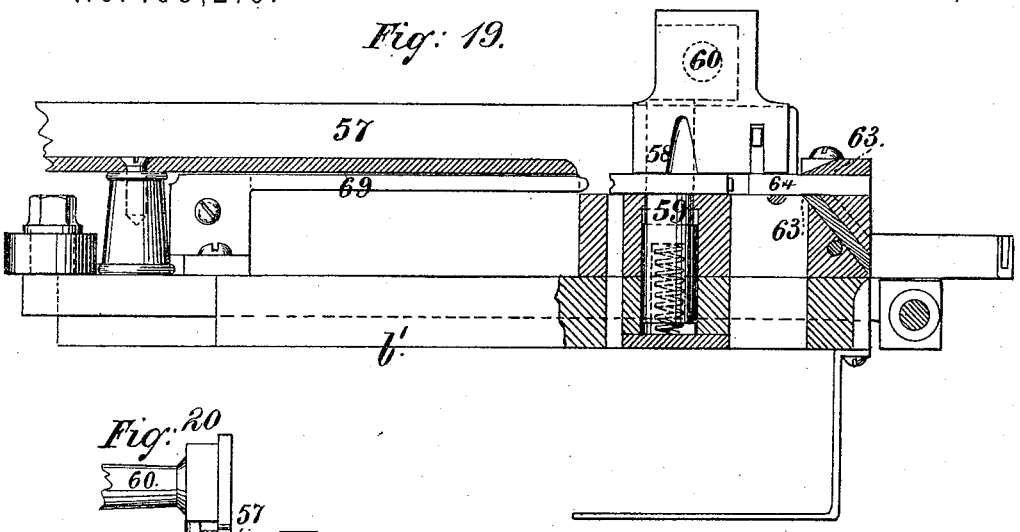


Fig. 20

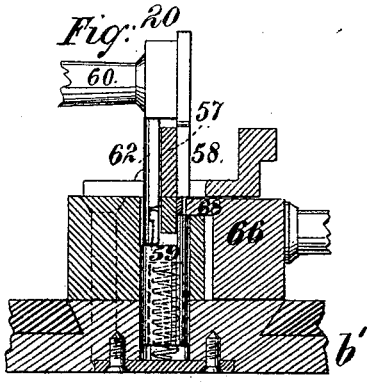
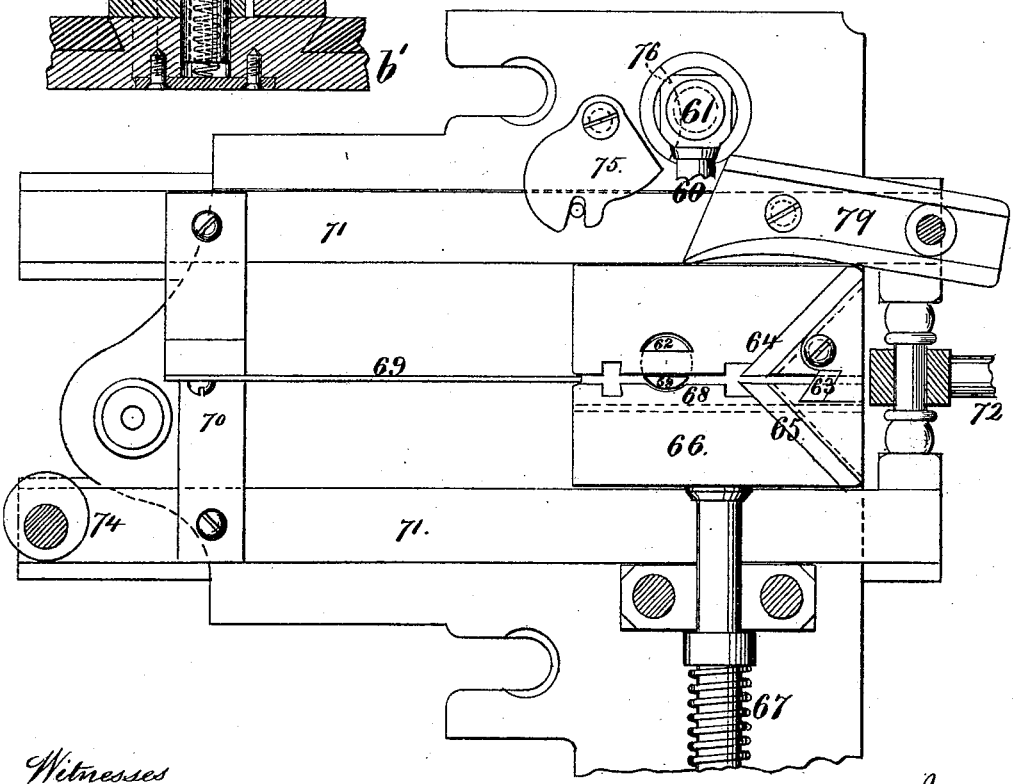


Fig. 21.



Witnesses

Chas. H. Smith

Harold Serrell

Inventor

Charles S. Westcott

per Lemuel W. Serrell

Atty

UNITED STATES PATENT OFFICE.

CHARLES S. WESTCOTT, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE WESTCOTTS TYPE-SETTING COMPANY, OF NEW YORK, N. Y.

IMPROVEMENT IN TYPE CASTING AND SETTING MACHINES.

Specification forming part of Letters Patent No. **169,216**, dated October 26, 1875; application filed August 11, 1875.

CASE B.

To all whom it may concern:

Be it known that I, CHARLES S. WESTCOTT, of Elizabeth, in the county of Union and State of New Jersey, have invented an Improvement in Type Casting and Setting Machines, of which the following is a specification:

This invention is based upon the general mode of operation set forth in Letters Patent No. 115,796, granted to me June 6, 1871.

The machine contains keys appropriated to each letter, character, and number that the machine is adapted to cast. When one key is moved it brings into action levers, slides, and other parts, that place a matrix-stock, carrying the matrix corresponding to the letter or mark on the key, in position to be taken by a carrier to the place where the casting is effected. The molds forming the body of the type are opened to the proper extent for making the sized body adapted to the letter. The type is cast, the matrix is withdrawn, carried back, and replaced in its receptacle. The type is taken out of the mold and brought forward to dressing-tools, that remove from the body of the type any burrs, fins, or inequalities, and the type is then set up in line. By this machine the types are cast and composed in the order in which the finger-keys are moved, and when the types are no longer required they are either melted up instead of being distributed, or else they may be distributed and used in the ordinary way, if desired.

Letters Patent in Great Britain, No. 2,111 of 1872, were granted for an improved apparatus of the general character of the beforenamed patent. These features of improvement form the subject of an application of like date herewith, and this present application relates to devices that have been completed since the said English patent was granted.

In the drawing, Figure 1 is a general plan of the machine. Fig. 2 is a cross-section through the casting mechanism at the line *x x*. Fig. 3 is a cross-section at the line *y y*, and the other figures are separately referred to.

The motive power for the machine is applied to the shaft *a*, and it is to be under the control of the attendant, so that it may be stopped by a friction-clutch, or any ordinary stop-motion, and instantly arrested, if desired or necessary. The shaft *a* is sustained in the end frames a^2 of the machine, and these frames are connected together by cross-bars, and the entire machine rests upon a suitable bed. The cylinder a^1 is revolved with this shaft *a*, and upon it are placed the cams to give the movements hereafter detailed, and such cams are of ordinary construction—that is, with surfaces inclined to a plane passing longitudinally through the shaft to give motion toward one end of the cylinder or the other, or with ribs projecting more or less to give motion in the line of a plane passing perpendicularly through said shaft *a*, or partially in both directions.

It will not be necessary to describe these cams in detail, and many of them are shown upon the drawing.

The bed b^1 is made with a longitudinal slot, in which the matrix-carrier B is moved back and forth by a V-shaped cam, a^3, upon the cylinder a^1. I remark that this cylinder a^1, by preference, makes one complete revolution while one type is cast, dressed, and set up in place; hence a complete movement of the entire machine is made every revolution of the shaft *a* and cylinder a^1. This matrix-carrier B is made, as shown, in larger size in the cross-section, Fig. 4, front view, Fig. 5, rear view, Fig. 6, and end view, Fig. 7, and plan, Fig. 22, and the matrix-stock itself is made, as shown in the front view, Fig. 8, and edge view, Fig. 9. Each matrix-stock *c* is made, by preference, in two parts, secured together by the screws 2 2, which project in the form of pins, for a purpose hereafter named, and the matrix for the type is made in the block 3, and this block may be removed from the stock *c* when changes are made in the font of type.

The holes in the matrix-block 3 are larger than the screws, and the block is held firmly to the stock *c* by the heads of the screws 2, after the said block has been adjusted, so as to position the matrix properly in relation to the stock, so that the letter will be located correctly at the end of the type-body. In the matrix-stock *c* there is a mortise, adapted to

receive the gripers *d d*, that are jointed together and placed within the matrix-carrier B, and the gripers *d* and a block, 4, to which they are pivoted, slide freely in a groove in a swinging stock, 5, provided for them in the carrier. The object of this is to open the gripers and grasp the matrix-stock, in addition to allowing the matrix a horizontal movement toward and from the type-molds when they arrive at such mold.

As the gripers and carrier move toward the matrix-stock to convey the same from its frame, the parts are in the position shown in Figs. 5 and 6, with the ends of the gripers closed. The ends of the gripers pass freely into the mortise of the matrix-stock, and the shoulder of the gripers stops against the matrix-stock. The carrier B continues its movement, and as it goes forward the inclined slots or grooves 6 7 8 act upon pins that project from the sides of the griper. These slots first open the griper, and, by the barbed ends, seize the stock firmly; then the further movement lifts the griper and stock bodily, the object of this being to raise the pins 2 out of the notched sockets provided for them in the frames *e*, and thereby the matrix is held firmly by the carrier, and then it is freed from its frame *e*, and carried to the mold clamped thereto, and the type cast, as hereafter described; then the carrier and matrix-stock are brought back by the V-cam a^3, and as the pins 2 pass into the notched sockets of the frame *e*, the stock is stopped, and as the carrier B continues to draw back, the griper is moved down, and then it closes, separating the fork from the matrix-stock, leaving such stock in its frame, after which the carrier continues to move to the left until the block 4 is pressed against the yielding finger e^5, Fig. 1, which positively closes the gripers, so that they reassume the closed position of Fig. 5, ready to move to the left and take the next matrix-stock that may be presented to it upon its next forward movement. The matrix-stocks are mounted in the frames *e*, and each frame, Fig. 23, is made with five compartments. Four of these are adapted to receive four matrix-stocks, constructed as aforesaid, and the fifth and central compartment is large enough for the carrier and a matrix-stock from another frame to pass freely through the same. The normal positions of these slide-frames *e* is that shown in the cross-section, Fig. 3, with the central compartment in position for passing the carrier, and it is now to be understood that these slide-frames *e* are to be sufficiently numerous to receive as many matrix-stocks as there are letters, numbers, &c., to be cast by the machine, and these slide-frames stand side by side in grooves that are made transversely of the metallic frames or bars b^4 b^4; and I will now proceed to describe the means made use of to slide these frames back and forth, in order that the matrix-stock may be brought into the path of the carrier.

I provide four ranges of keys, and there is one key to each matrix, and marked to correspond to the letter, sign, or number of that matrix. By the depression of that key, mechanism is brought into action that places the matrix-stock in the path of the matrix-carrier, and holds the same in position while the matrix and stock are carried away, the type cast, and the matrix returned to place; and in connection with the finger-keys there are safety appliances, all of which are hereafter described, that prevent a second key becoming operative on the mechanism until the precedingly operating devices are all returned to a normal position, and, in addition, there are devices that convey a blank matrix to the casting mechanism, in order that the movements of the machine may always be complete every revolution of the main cylinder, and a space cast whenever there is not a key depressed to cause a type to be cast.

Between the stationary frame-pieces *g* there is a shaft, *g'*, with a pinion near each end, gearing at top and bottom into slide-bars h^1, with cross-bars *h* and *i* between them. At one end of one of the bars h^1 is a roller, that is acted upon by the lever h^2 and cams h^3 upon the cylinder a^1. By this arrangement the pinions and shaft *g'* are turned by moving the slide-bar h^1, and produce a parallel movement of the bars *h* and *i* toward each other, and then from each other. The bars *h* and *i* are above the stationary grating *k*, between which are the pin-bars *l*, that are connected by links 15 to the frames *e*, there being a pin-bar and link to each frame. Each pin-bar has four movable pins, *n*, in it, and two stationary pins or blocks, *n'*, toward the ends. The grating-bars *k* are made T-shaped, with flanges upon their upper edges, and these bars are held in position by bars *k'*, attached above their ends, and the pins *n* are made with heads, removed at one side, and they move freely through the pin-bars, and are guided and held in place by the cross-pins in vertical slots in the pin-bars, as seen in Fig. 10, which is a cross-section of a part of the pin-bars and grating, and the flanges of the grating-bars are removed above the pin-heads *n*—at the place occupied by such pin-heads when in their normal position.

Two or more banks of finger-keys, *t*, are made use of—preferably there are four—and two rows of key-buttons in each bank, so arranged that there are four keys and their connected levers t^1 to each pin-bar, and the lengths of all these levers are such that they terminate, by preference, in one line at the rear, and rest upon a bar, t^2, having vertical comb-plates to keep the levers apart, and allow them to be moved. Connected with each lever is a push-pin, t^5, below the pin *n* in the pin-bar *l*, that is to be raised by the depressing of the key upon such lever.

I prefer to move the keys that are depressed, and hold them, automatically, as hereafter described; but the operation of the parts thus far set forth is that, when a key is depressed, the push-pin t^5 raises up its corresponding pin

n in the bar l, the bars h and i move toward each other, and, taking the head of the pin n, carry it to the center, between said two bars, h i, at their point of nearest approach, and, in so doing, the frame e, to which the pin-bar is connected, is moved either one way or the other. If the pin n nearest the banks of keys is raised, the frame e will be carried back, bringing the first compartment and its matrix-stock in line, to be taken by the carrier or traveler B, as before described.

If the last pin n farthest from the keys is raised, the slide e will be moved forward by the bar i. Hence, according to whichever pin is raised, so the frame e will be moved, to have the matrix-stock taken from one or the other of the divisions in such frame e. The head of the pin n, coming above the flange of the intermediate or end grating-bar k, cannot drop until it arrives beneath the vertically-moving blade o, where such flanges are removed, and this blade o is actuated at the proper moment to push down the pin n, and allow the pin-bar l and frame e to be returned to a normal position by the bars h and i moving apart and acting upon the pins or studs n' that are near the ends of the pin-bars.

By this means it is impossible for any slide-frame e to become displaced. The movements are positive, and the movements of the keys are completed automatically, and they are held by the means next described.

The bar o^1 is moved up and down by a positive motion at the proper time. This motion may be from the cam and lever with diagonal slots, (seen in Fig. 11,) and such bar o^1 is above the inner ends of the key-levers t^1. Hence, as the key is depressed it rises against this bar, and can move no faster than it allows such key to move, and a spring catching-bar, o^3, (see Figs. 3, 11, and 12,) is thrown by a cam in below the end of the key as it moves. Hence the end of the key-lever is caught, and the key-lever receives its full movement automatically from such bars, and it is held up until the slide-bars h or i have moved and actuated the pin n and its bar and frame, after which this bar o^1 is again returned to place, the catch-bar o^3 springs back, and the end of the key liberated. No other key-lever can be depressed sufficiently to be operative while the bars o^1 and o^3 are above their ends. Hence there is no risk of injury, except in cases where two keys are simultaneously and designedly depressed, because the operator can remove the finger from the first key as soon as the same commences to move automatically, and rest his finger upon the next key, and depress the same into a position to be taken by the automatic mechanism after the first key has been returned to a normal position, and so on; hence no time is lost, and the operator's duties are lessened. The cross-bar o is upon slides 16, and it is actuated by the cross-shaft 17, arms 18, and an arm, 19, Fig. 1, to a cam upon the cylinder a^1, so as to push down whichever pin n is brought centrally beneath it, and this operation is timed to harmonize with the other movements. When either key is depressed its lever t^1 raises a swinging frame, r, and by its push-pin r^5 the claw r^1 is raised. This claw r^1 is jointed to the bar i, and when raised it is inoperative; but when neither of the keys is depressed this claw r^1 remains upon a stud, 20, at the side of the last pin-bar l, and causes the bar i to move the same to bring the matrix for a space and its stock into line with the matrix-carrier. Hence, if a type is not cast, a space will be cast, and all the movements of the machine will go on regularly.

Each matrix-stock is rather wider than the grooves between the bars b^4, in which the frames e move, and the parts are constructed as seen in Figs. 3, 4, and 23, so that the under side of the bars b^4 prevents the matrix-stock being lifted out of the frame except when the matrix-stock reaches the central position for the carrier, at which place the bars b^4 are stopped, and the plate b^5 is grooved, as seen in Figs. 3 and 4; hence the stocks cannot become misplaced or disconnected from the frame e during the movement of said frame e; but as such matrix-stocks have to be moved across such central groove, through which the carrier passes, and the stocks might become misplaced by the sudden stopping and starting of the slide, the longitudinal groove in the plate b^5, that passes across the bars b^4, is fitted with a bar, s, that is grooved transversely, having ribs that correspond to the bar b^4; and to this bar a movement is given vertically by the lever s^1, slide s^2, and a cam upon a^1, positioned so that the under surfaces of said grooved bars b^4 and s will coincide during the time that the frame e is being moved back or forth; but as soon as the said frame stops for the matrix-carrier to pass along and take the matrix to the molds, as aforesaid, then this bar s is lifted up out of the way of the matrix-stock, so that said stock and its pins 2 can be lifted up and taken out of the frame e.

The bath of type-metal, and means for mounting, heating, and forcing the metal into the molds, are as follows: The type-metal is contained in a tank or bath, p, of suitable size, and heat is applied below the same, and preferably from gas-burners, and the temperature is regulated to a nearly uniform degree; but, in consequence of the unavoidable variations in temperature, difficulties have heretofore arisen from expansion and contraction, varying the adjustment of the bath in relation to the machinery. The metal is forced from the bath by a plunger, p^1, through the conduit 30 to the nipple 31, (see Figs. 2 and 14,) and as that is the place where the expansion of the bath or tank and furnace is the most detrimental the parts are left to expand freely from this nipple in all directions, but the nipple itself remains uninfluenced and fixed in its position. To accomplish this object the tank is sustained by the screw-centers or trunnions

33, that are in line transversely with the surface of the nipple, or nearly so, in order that a horizontal and vertical plane might pass through both the nipple-face and the connecting-screws; hence the bath can expand and contract in any direction without changing the adjustment of the bath in relation to the molds and matrix. The cylinder p^2, in which the plunger p^1 operates, is provided with an inlet-hole, 34, through which the melted metal flows as the plunger is raised. This plunger p^1 is lifted by the bent lever p^3, and it is held up until the molds are closed for the type, as hereafter described, and then the lever descends and applies power to the spring to press the plunger upon the molten metal. This causes the metal to pass up the conduit 30 to the nipple 31; and as soon as the mold is all ready the valve t^6 is withdrawn, and the jet of metal is thrown with force directly into the matrix, so that the letter end of the type is first formed, and is perfect and free from air-cells, and any atmosphere in the mold will be contained in cells along the body of the type, and will not be injurious.

There is a horizontal rib across the face of the nipple, so that a groove is made in the base of the type, and the ordinary sprue in casting types is dispensed with. There is nothing to be broken off the types, and there is no risk of imperfect-faced types.

This valve t^6 is a small rod passing through the sides of the tank, preferably above the melted metal; hence it can be removed, if necessary, for cleaning out the hole in the nipple 31 whenever necessary, without the type-metal running out; or, if the type-metal should be at too high a level, a portion of it may be dipped out with a ladle.

This is a great improvement over the valves heretofore employed, that were operated by an arm passing down into the melted metal, because the valve could not easily be removed and the hole cleaned.

This valve-rod is actuated by a bent lever, t^7, (see Fig. 1,) and cam upon the cylinder a^1, and the parts are timed to open the valve when the mold is ready for casting, and instantly to again pass into its place to close the nipple-orifice after the casting has been done, and by the end of the valve projecting slightly there will be a slight cavity in the nick of the type instead of any projection, as has been usual in ordinary type-casting machines.

By my improvement the metal is cut off at a point between the foot of the type and the letter, so as to cast both the letter and its foot perfectly.

The back of the nipple 31 is the segment of a globe, (see Fig. 14,) and the nipple is held back into a similar recess in the nose of the bath, and for this purpose a sleeve may be used, as seen in Figs. 1 and 14, retained by a set-screw; but preferably a lever or spring, t^8, with an eye surrounding this nipple, and attached to the bath p, as by screws, or by a stud at one end and a spring at the other, as seen in Fig. 1, may be made use of. In either case the nipple can accommodate itself to the pressure of the molds, and make a true joint that will not allow of the escape of the type-metal. The nipple-socket may, by the pressure of the valve, sometimes allow small drops of type-metal to pass into the cylinder surrounding the nose of the bath. This cylinder is to be loose, so as to allow such drops of melted metal to run out from time to time into a receptacle.

The molds are seen in the section, Fig. 2, and in larger size in elevation, Fig. 15, in a sectional plan, Fig. 16, and by a sectional elevation, Fig. 17.

The top plate u is removable with the parts of the mold from the machine; but when in position it fills the oblong hole in the stationary top plate w^1 of the machine, and it is held down by buttons 35, with clamping-inclines upon their under surfaces. Upon this plate u there are brackets u^2, sustaining the horizontal attaching-screws 36, upon which the mold-frame w^3 swings toward and from the nipple of the bath of melted metal; and this frame w^3 passes through the plate u, and sustains the molds, which are composed of three principal parts—viz., the bottom block v, with a right-angled ledge in the upper surface, in which one angle of the body of the type is cast, and which ledge corresponds in width to the thickness of the body from top to bottom of the letter, the upper block v^1 of the mold, which is flat upon its under side, and the intermediate regulating-plate v^2, that fills the space between the bottom and top block, and hence the width of the body of the type is regulated with the greatest accuracy, according to the distance between the end of the regulating-plate and the ledge of the bottom block. It is, therefore, necessary to move this regulating-plate back to open the mold less for the narrow bodies of such types as "i" and "l," and wider for such as "m" and "w." This is effected by the slide-bar 37, that is in a groove in the block v^1, and has an arm, 38, against which the face 3 of the matrix-stock c is pressed by the carrier, and by removing less or more of the face of this matrix-stock, so the mold will be opened wider or narrower to form a thick or thin body.

The end of this bar 37 acts against a stud and adjusting-screw, 39, upon the plate v^2, and presses the plate v^2 back against the action of the spring in 52 the distance required for opening the type-mold. The normal condition of the mold is closed before the matrix-carrier approaches it. The means for first opening it to the proper thickness to form the type-body have been described. The operations performed are in the following order: Second, the molds are clamped; third, the molds and matrix are pressed together, and the mold pressed back against the nipple; fourth, the melted type-metal is injected and the type cast, as aforesaid; fifth, the matrix is drawn back off the type; sixth, the ma-

trix is taken back to its place by the carrier, as before described; seventh, the mold is drawn away from the nipple; eighth, the pressure holding the molds together is relieved, and the regulating-plate is drawn back enough for a hook, v^3, to be passed in between the blocks v and v^1; ninth, mold-block v is moved still farther to carry the type that is cast into that hook; tenth, the hook draws out the type into a trough; eleventh, the molds are closed and returned to position ready for the next operation, and in doing this the end of the regulating-plate v^2, coming up against the shoulder in the mold v, carries to that point any fine particles of metal that may remain in the mold from the type previously cast. These particles do no harm at this point, because they are cast into the body of the next type; hence the molds do not become dirty or obstructed, but continue fully operative.

The mechanisms for performing these operations are comparatively simple, but will be described in the order of the operations as named: Second, a pin, 40, passes vertically through the mold-frame, and rests upon a steel plate, 41, above the block v^1, and a lever, 42, acted upon by a vertical rod, 43, beneath which is a cam upon the cylinder a^1, presses the pin 40 upon the molds, to clamp them firmly as soon as they have been opened the distance necessary for forming the body of the type. Third, a bar, 44, sliding through a fixed arm, 45, is moved by the bent lever 46, adjusting-link 47, rocking lever 48, Figs. 2 and 18, and cam upon the cylinder a^1, and the end of this bar 44 presses upon the matrix-stock c, forcing the matrix tight against the front face of the mold, and pressing the mold back against the nipple, and holding the parts while the casting takes place. Fifth, the bar 44 has a small hook, 49, that is in a position for the end thereof to enter the mortise in the matrix-stock c, between the ends of the nippers d, and this hook acts upon the matrix-carrier and matrix, to draw the same bodily off the type, and allow the matrix to be carried to its place. A guard-finger, 54, Fig. 1, serves to prevent the mold swinging forward at this time, and this guard-finger is held, as hereafter described. Seventh, the retractile bar 44 has a hook, 51, at its end, and it is connected by a pin in a slot with the lever 46, and the hooked end comes behind the screw 50 upon the mold-frame w^3. The slot in this retractile bar allows the matrix to be first drawn off and then taken back to its place, and the further movement of the lever 46 swings the frame and mold away from the casting-nipple. Eighth, the slide 52 has a spring-bar and pin, 53, connecting it to the regulating-plate v^2, and this slide is moved to the left by a cam on a^1, which first draws the regulating-plate back, and then the hook v^3 is passed in between the molds by the action of the lever 55, that is upon a vertical shaft, 56, and has an arm below the plate b^1, and this is acted upon by a cam upon a^1. Ninth, after the hook v^3 has been moved back far enough for its end to be behind the type, the entire mold v is moved along by the cam on a^1 continuing to act, through 52, 53, and v^2, upon said mold v sufficiently to move the type into the hook v^3; then the hook is moved, and draws the type out from between the molds v and v^1 into the slide 57.

A stop should be provided to arrest the movement of the mold v with its shoulder exactly in line with the vertical side of the trough 57.

The different thicknesses of type compress the spring of the hook v^3 more or less; but the end of the hook is adapted to any thickness of type, as its end moves just clear of the shoulder in the mold v, which is in line with the vertical side of the trough 57.

It is to be understood that the pressure upon the molds to clamp them is removed by relieving the lever 42 before the molds are moved or the type is drawn out.

When it is desired to cast the type with a nick in the edge of the body, there is a rib employed upon the under side of the block v^1 of the mold, and this only continues far enough to form the nick in any width of type; hence the movement of the portion v of the molds carries the type clear of this rib before the type is drawn out endwise from between the parts v v^1.

The hook v^3 carries the type along in the trough 57 to the gripers 58 and 59, that grasp the type-body upon its upper and lower edges, and carry it down into line with the cutters, that dress off any fins or burr. The lower griper 59 is raised by a spring, (see Figs. 19 and 20,) or it may be raised positively by a hook, as shown by dotted lines in Fig. 20, and the upper griper is moved by an arm, 60, and vertical slide-rod 61, which is drawn down to a definite point by a spring, or by a cam upon the cylinder a^1; and this gripper 58 is notched, as seen in Fig. 19, so as not to interfere with the spring of the hook v^3 when thin types are operated upon.

Each part of the griper is made shorter and narrower than the body of the type, so that it will grasp the smooth parts of the type, which are cast against the surfaces of the molds, leaving the angles, corners, and ends free, so that each type is grasped against the actual body, and this determines the size that the type is to be when finished, in order that any fins or projections beyond the required size may not, by any chance, get between the gripers, and thus allow a type to pass through without the removal of all projections beyond its desired size.

A pusher, 62, attached to the arm 60, carries down the griper 59, and prevents undue pressure upon the body of the type, the pusher 62 being adapted to touch the griper, as shown in Fig. 20, and prevent the contingency aforesaid.

There are two cutters, 63 63, which are sta-

tionary, and serve to dress off inequalities at the top and bottom of the letter upon the type, and two other cutters, 64 and 65, that dress off the sides of the letter-base and body of the type, and the cutter 65 is upon a movable stock, 66, that is drawn back by a cam upon a^1, and pressed up against the body of the type by the spring 67, Fig. 21.

The operation, therefore, is that, when the type has passed by the hook v^3 and trough 57, in between the gripers 58 and 59, they seize such type and carry it down, the stock 66 and cutter 65 being drawn back far enough for the thickest type. Then the stock 66 comes up, and the flange 68, Fig. 20, presses against the side of the type, and holds the same in position for the type to be moved bodily, and letter end first, through the opening between the cutters, that corresponds with and is in line with the body of the types.

The pusher 69 is used to move the type. This pusher 69 is upon a cross-bar, 70, from the forked slide 71, and this forked slide is in ways in the bed b^1, and it is actuated by the hooked link 72, lever 73, and cams upon a^1; and as the slide 71 is moved back its adjustable eccentric button 74 presses upon the finger 54 aforesaid, to hold the molds back, as before described, and after the type is in place the slide and pusher 69 are moved forward, and the end of the pusher is curved to act between the feet of the type and carry the same through between the cutters. In order that the upper griper 58 may not move, a segment, 75, Fig. 21, is moved by a pin upon the slide 71, and passes into a notch, 76, in the vertical rod 61, to lock the same. The type, after it has been dressed, passes out upon the composing-table 77, and the types delivered in the order in which the keys are manipulated. A pusher, 78, Fig. 1, is moved back and forth by a trough, 79, Fig. 21, upon the slide 71, taking a roller or pin depending from the pusher 78, and as each type is added the pusher moves the line of types along a distance equal to the thickness of the type added.

A block or quad at the end of the line keeps the types in position, and this is moved along with the types. A small bell, 80, upon this quad, and a hammer operated by the movable spacing-tappets 81, serve to indicate to the compositor that there are four or six, or any other known number of, ems to the end of the line, and thereby allow for spacing and dividing the last word into syllables, if necessary.

I claim as my invention—

1. The matrix-stock *c* and matrix 3, connected together by the screws 2, which also form pins for retaining the matrix and stock in the frame *e*, substantially as set forth.

2. The carrier B, having gripers *d*, sliding block 4, and swinging block 5, in combination with the pins and slots 6, 7, and 8, substantially as set forth.

3. The frames *e*, carrying the matrix-stocks *c*, and sliding in grooves between the bar b^4, in combination with the transversely-grooved bar *s*, and mechanism for raising and lowering the same, as set forth.

4. The range of frames *e*, carrying the matrix-stocks *c*, and sliding endwise between the bars b^4, in combination with the bars *l*, pins *n*, and a range of finger-keys moving such pins, and mechanism for acting upon such pins to move the frames and bring the selected matrix-stock into the path of the carrier, substantially as set forth.

5. The notched stationary grating *k*, in combination with the slide-bars *l* and pins *n*, for the purposes set forth.

6. The bars *h* and *i*, actuated in opposite directions by the racks h^1 and pinion, in combination with the slide-bars *l*, pins *n*, and frames *e*, substantially as set forth.

7. The cross-bar *o*, in combination with the slide-bars *l*, pins *n*, and grating *k*, for the purposes set forth.

8. The lifting-pins t^5, levers b^1, and keys *t*, in combination with the slide-bars *l*, pins *n*, and bars *h* and *i*, substantially as specified.

9. The claw r^1 and frame *r*, in combination with the range of finger-key levers t^1 and the slide-bar *l*, for the purposes and substantially as set forth.

10. The bar o^1 and lifter o^3, in combination with the range of finger-keys t^1, and mechanism actuated by such keys, substantially as set forth.

11. The bath of type-metal, provided with a casting-nipple, in combination with attaching supporting-screws, that are in line, or nearly so, with such nipple, so that the nipple is not displaced by expansion, substantially as set forth.

12. The segment of a globe at the back of the nipple 31, entering a similar recess at the end of the nose upon the bath, in combination with the device t^8, for holding the nipple to place, but allowing such nipple to accommodate itself to the type-molds, as set forth.

13. In combination with the bath of melted metal and the conduit 30, a plunger, p^1, actuated by yielding mechanism, and the valve and rod t^6, that are removable from the rear without disturbing any of the parts of the bath, substantially as set forth.

14. The mold-frame w^3, suspended from the centers 36, in combination with the removable plate *u* and the type-molds, substantially as set forth.

15. The two-part type-mold *v* v^1, in combination with the regulating-plate v^2, that is adjustable to vary the width of type, substantially as set forth.

16. The combination, with the molds *v* v^1 and regulating-plate, of the matrix-stock and a connection, 38, between the matrix-stock and the plate v^2, for varying the thickness of type according to the letter to be cast, as set forth.

17. The plunger 40 and lever 42, in combination with the molds *v* v^1, for pressing such molds together previous to casting, substantially as set forth.

18. The bar 44, hook 51, and means for act-

uating the same, substantially as specified, in combination with the mold and the matrix and its carrier, substantially as and for the purposes set forth.

19. The combination, with the molds v v^1 and regulating-plate v^2, of the delivery-hook v^3 and mechanism, substantially as specified, for giving the motions to the respective parts, as set forth.

20. The combination, with the molds v v^1, of the regulating-plate v^2, and mechanism for moving said regulating-plate between the successive casting operations, for the purposes set forth.

21. In a type-casting machine, the molds v v^1 and their supporting-frame, in combination with the mechanism for opening such molds and moving them laterally, and the delivering device v^3, that receives and withdraws the type, substantially as set forth.

22. The trough 57, spring and hook v^3, in combination with the type-molds and mechanism for moving the hook, substantially as specified.

23. The gripers 58 and 59, constructed and operating substantially as set forth, in combination with the pusher 69, and cutters to dress the type, as set forth.

24. The cutters 63 64 65, applied to and combined with the movable block 66 and pusher 69, substantially as set forth.

25. The composing-table 77 and pusher 78, in combination with the trough 79 upon the slide 71, as set forth.

26. The bell 80, attached to the quad that moves with the types upon the composing-table, in combination with the adjustable tappets 81, as and for the purposes set forth.

Signed by me this 9th day of August, 1875.

C. S. WESTCOTT.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.