E. B. BARBER.

TYPE CASTING AND COMPOSING MACHINE.

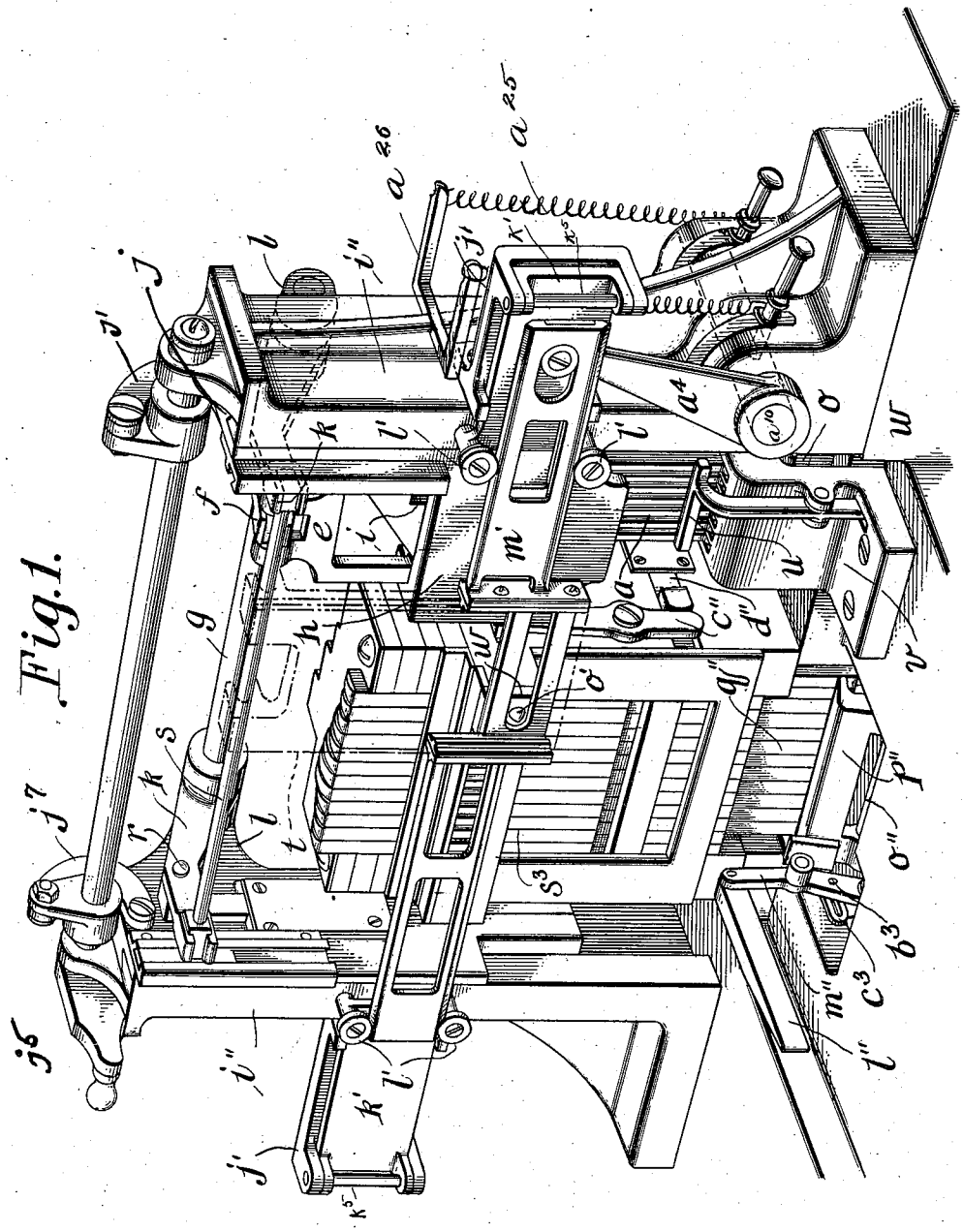
APPLICATION FILED MAY 31, 1910.

1,028,660.

Patented June 4, 1912.

8 SHEETS—SHEET 1.

Fig. 1.



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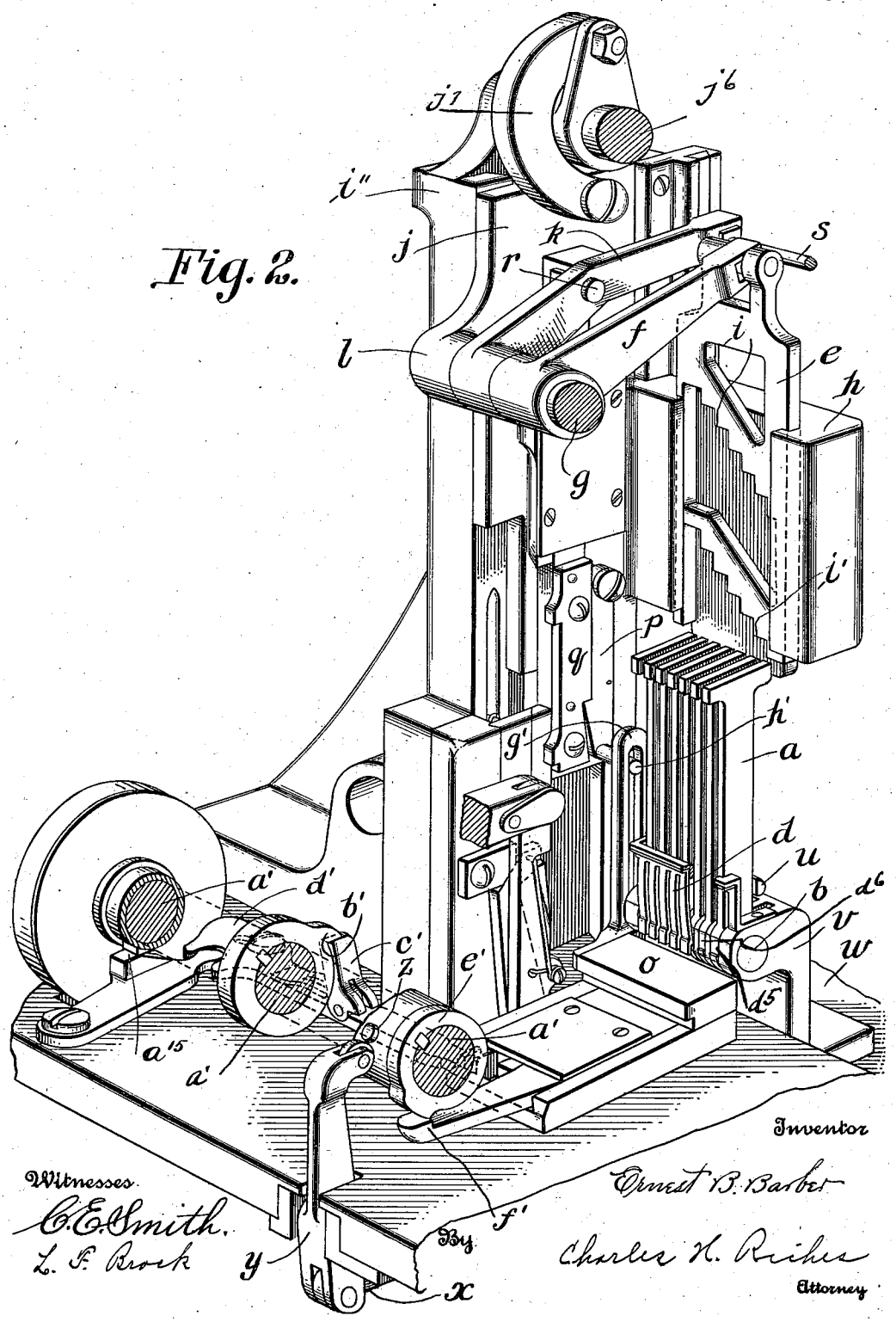
8 SHEETS—SHEET 2.

Fig. 2.



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8 SHEETS—SHEET 3.

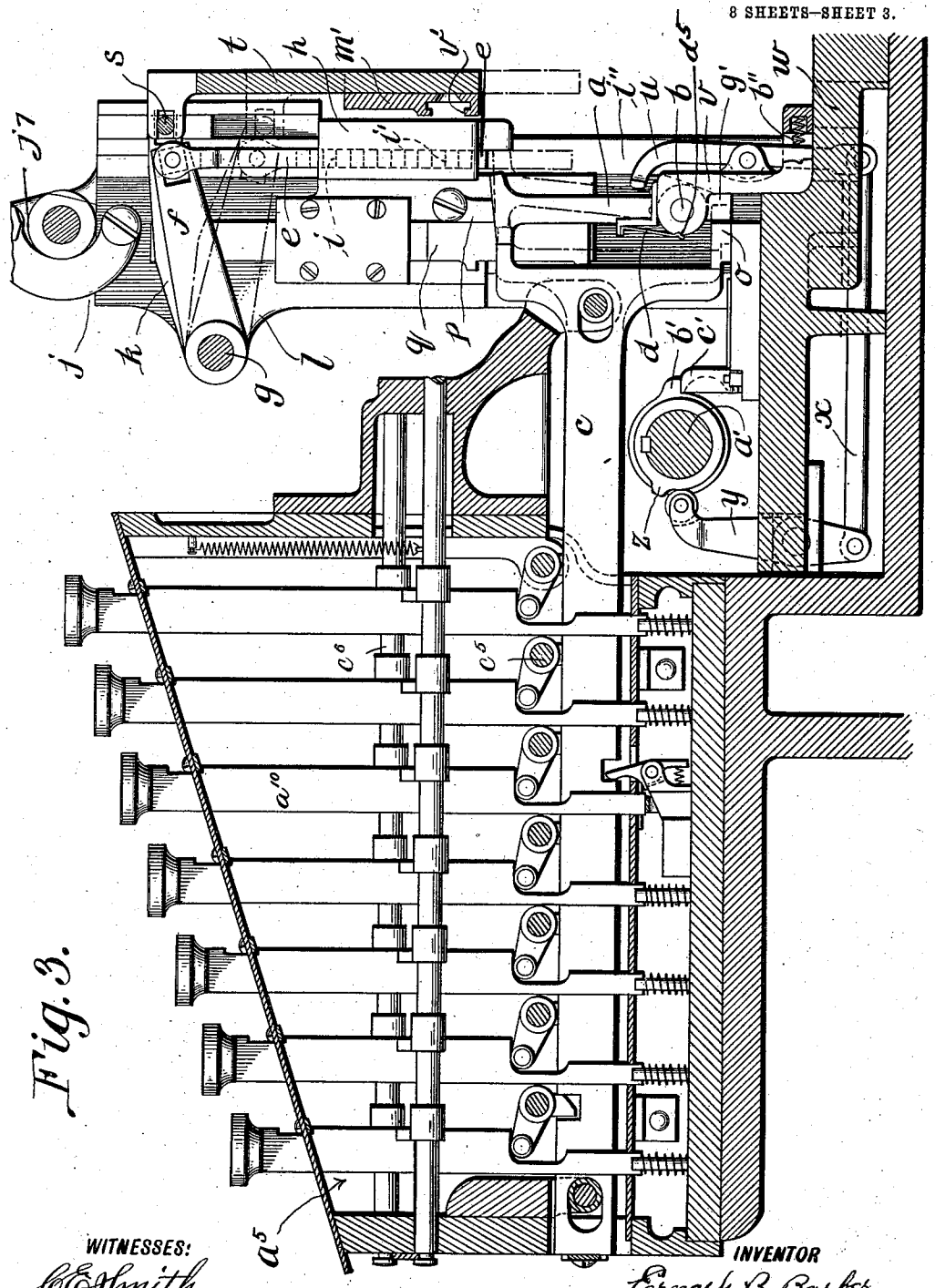

Fig. 3.

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8 SHEETS—SHEET 4.

Fig. 4.

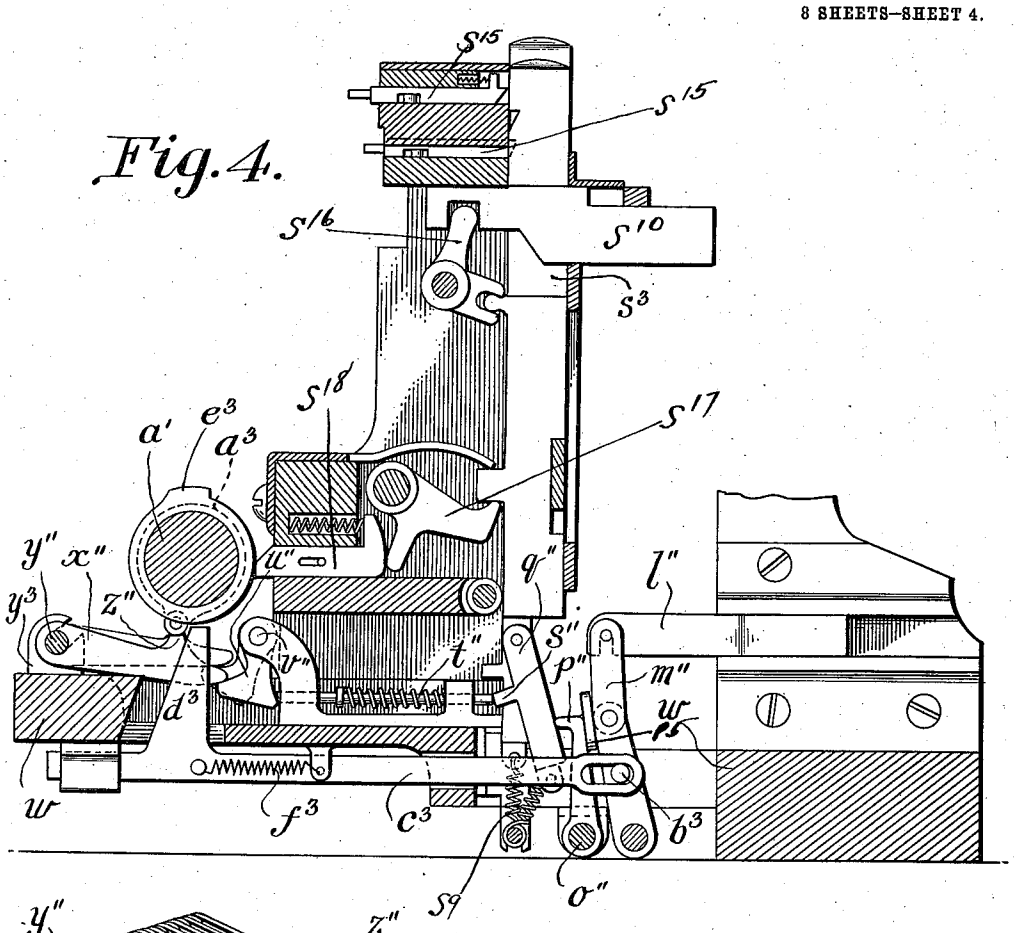
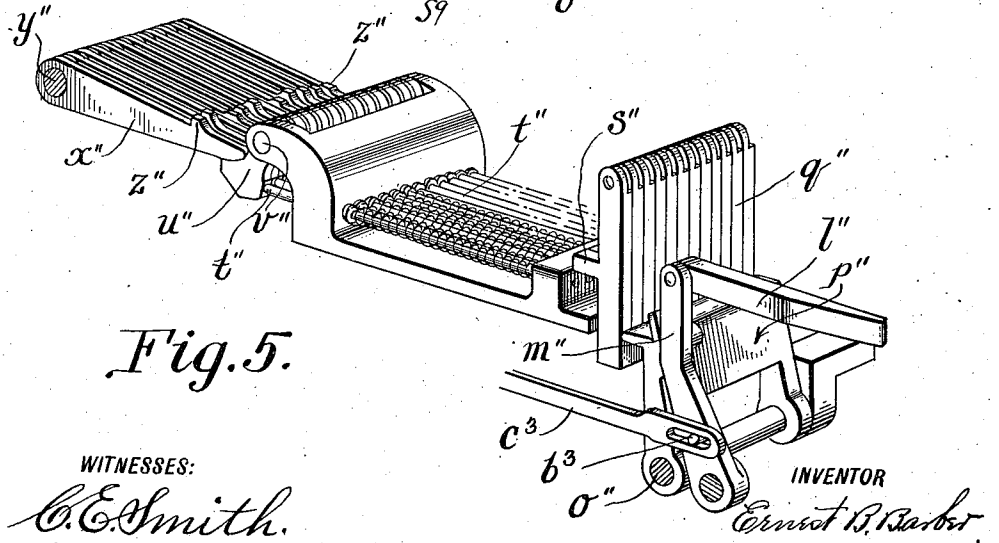


Fig. 5.



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TYPE CASTING AND COMPOSING MACHINE.

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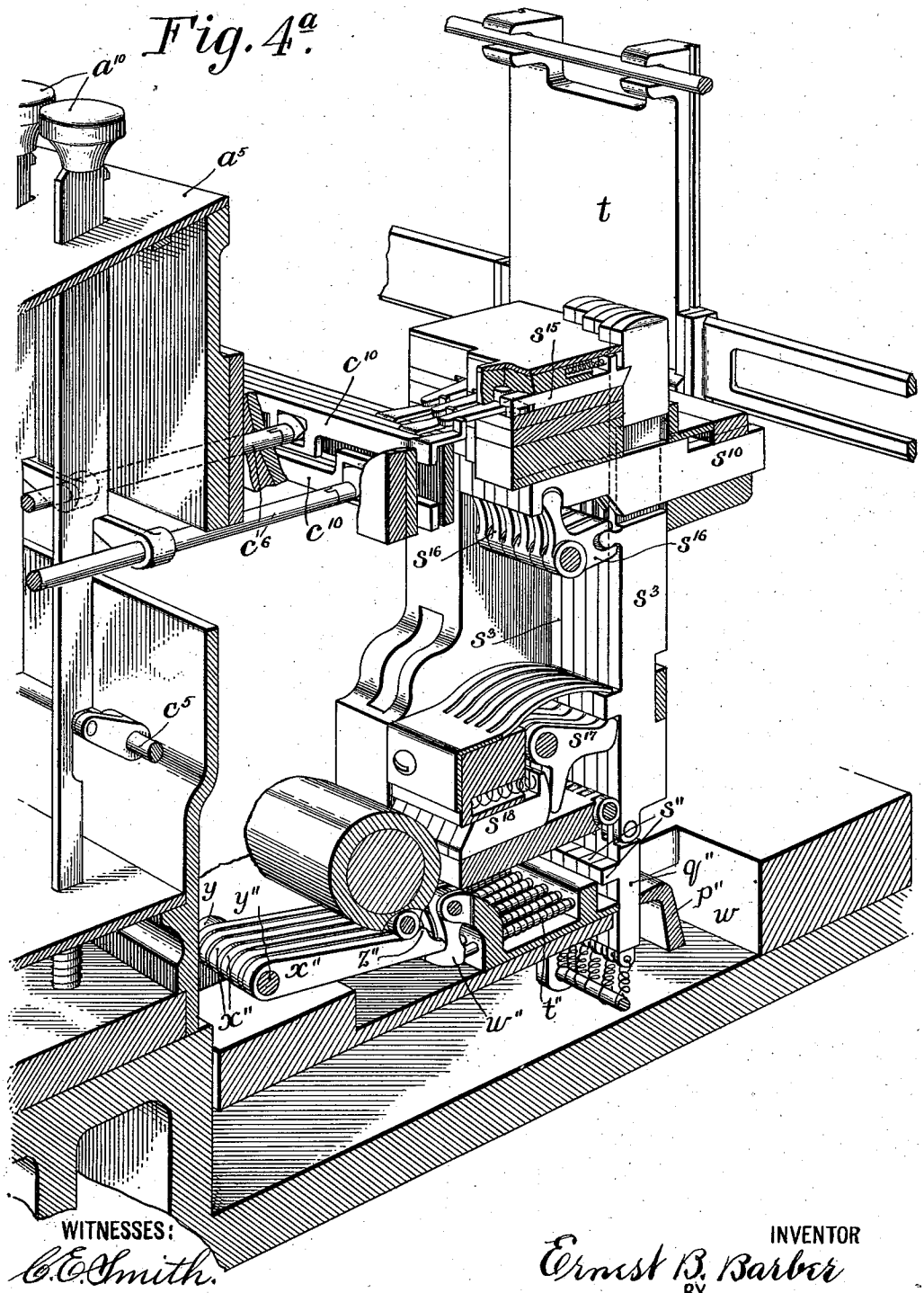
8 SHEETS—SHEET 5.

Fig. 4a.



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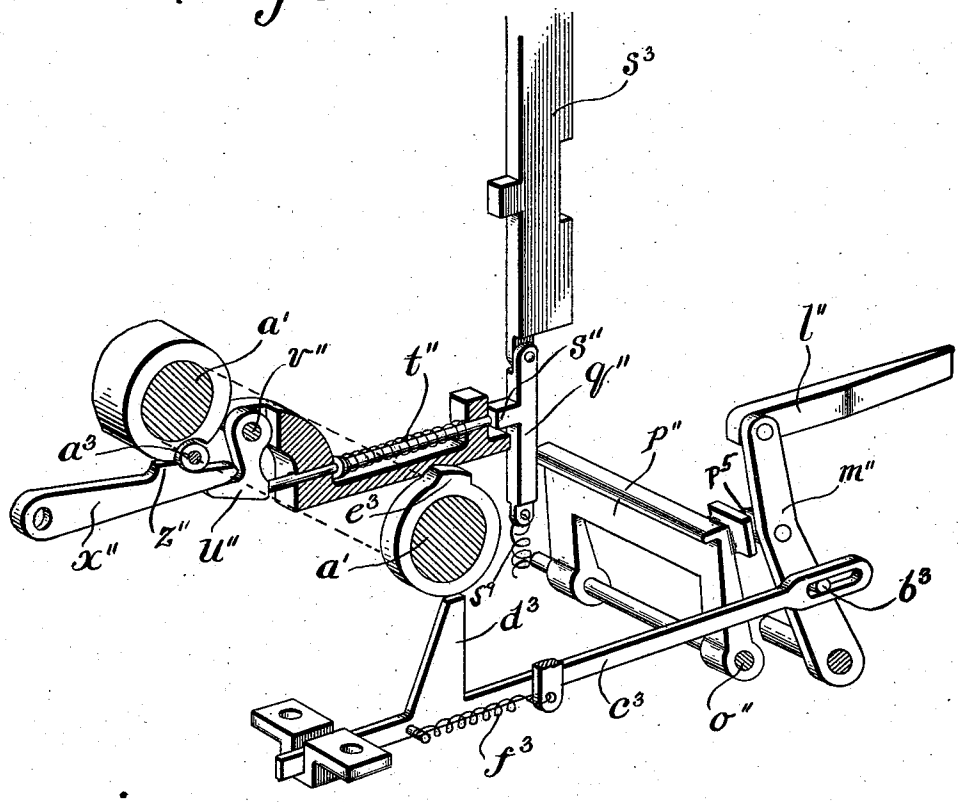
TYPE CASTING AND COMPOSING MACHINE.

APPLICATION FILED MAY 31, 1910.

1,028,660. Patented June 4, 1912.

8 SHEETS—SHEET 6.

Fig. 5.a



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TYPE CASTING AND COMPOSING MACHINE.

APPLICATION FILED MAY 31, 1910.

1,028,660.

Patented June 4, 1912.

8 SHEETS—SHEET 7.

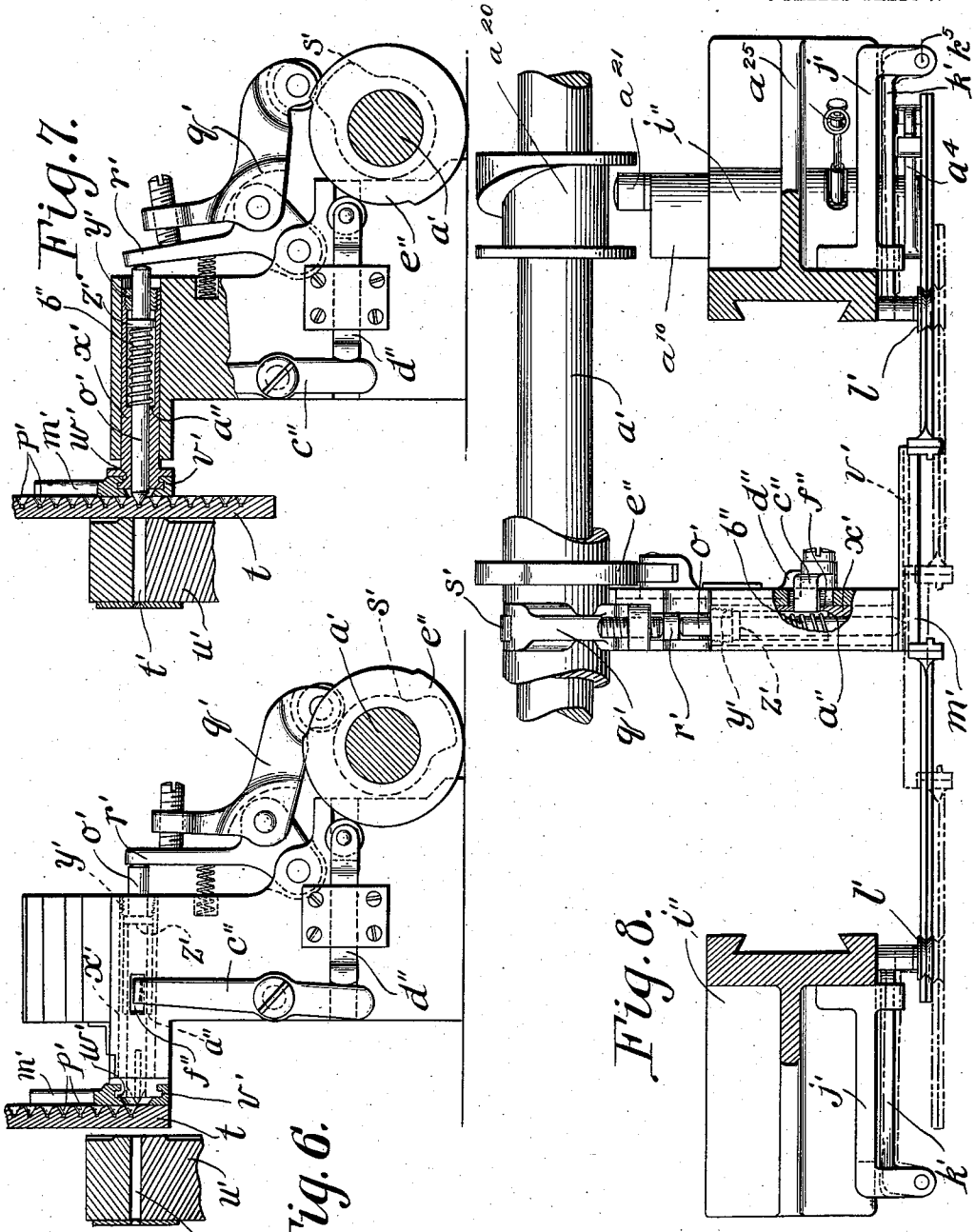

Fig. 7.

Fig. 6.

Fig. 8.

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8 SHEETS—SHEET 8.

Fig. 9.

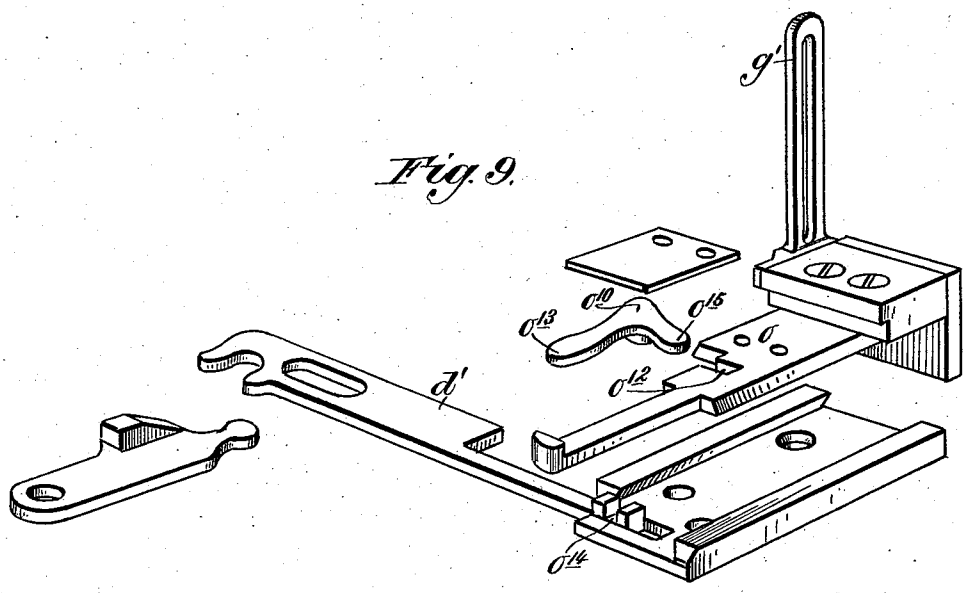
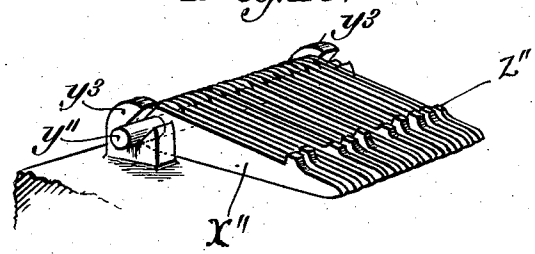


Fig. 10.



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UNITED STATES PATENT OFFICE.

ERNEST B. BARBER, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INTERNATIONAL TYPESETTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TYPE CASTING AND COMPOSING MACHINE.

1,028,660. Specification of Letters Patent. Patented June 4, 1912.

Application filed May 31, 1910. Serial No. 564,290.

To all whom it may concern:

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

My Patent No. 1,002,212 for machines for casting and composing type bodies, dated September 5th, 1911, relates to an apparatus which will produce individual types in any desired sequential order from matrices arranged in rows in two directions, in one or more fields, on a two-way moving matrix plate, with means for bringing any selected field into operative relation with a type body mold; two sets of stops, operably connected with a key board, being provided for bringing any desired character of the operative field to the casting position, one set of stops arresting the vertical flight, and the other set of stops arresting the horizontal flight, of the matrix plate; the stops arresting the vertical flight consisting of a comb with one permanent stop and sufficient movable stops, together equal to the number of horizontal rows of matrix characters in the matrix field, the permanent stop being constantly in the path of the matrix plate and the movable stops being pushed into its path by stop selectors actuated by pressing the character keys; the matrix plate being suspended from a matrix plate shaft mounted in vertical slides having arms fixed at one end to the elevator rock shaft, and connected intermediate their ends with the elevator slides by which the matrix plate is returned to its elevated position where it is temporarily held by a movable detent released through the agency of the elevator releasing slide when actuated by the stop selectors. The attrition resulting from the impact of the matrix plate on the stops arresting its vertical flight and the friction generated by its contact with those stops during its horizontal flight were not manifest during the experimental stages of the machine but became marked as the development of the machine progressed.

To eliminate this attrition and friction is one of the objects of my present invention which I have endeavored to accomplish by substituting for the stopping plate comb and the stopping plates, arresting the vertical flight of the matrix plate, a stopping element, having a set of stops for each matrix field stepped diagonally across the stopping element and vertically movable in a slideway adjustable with the field shift so that their fixed relation with the matrix plate will not be altered when the field shift is actuated to change the matrix field.

In my said patent I have also described how the matrix plate and related parts are mounted on a shift plate, the action of which brings the matrix plate into and out of engagement with the type body mold, and I have also described how the selected matrix is centered with the mold cavity by a centering pin actuated by a lever operating under the influence of a cam revolving with the high speed shaft. I have found however that the movement of the shift plate can be avoided by the independent lateral movement of the matrix plate, this being accomplished by providing oscillating arms to carry the grooved idlers guiding the lengthwise movement of the matrix plate carriage, the swinging movement of the oscillating arms being sufficient to bring the matrix plate into contact with the type body mold for the casting of the type character and the retraction of the matrix plate when the cast is made for the return of the matrix plate to its normal position.

In my said patent I have also shown and described an adjustable wedge for varying the thickness of the type bodies, this adjustable wedge being connected to a stepped plate actuated by drop bars attached to the stops arresting the horizontal flight of the matrix plate. I have in my present invention changed the detail construction of the wedge adjusting plate, and have added to the plate actuating mechanism, certain interchangeable parts which can be removed and replaced by others when changing the type body sizes.

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

Figure 1, is a perspective rear view of part of the machine, showing the matrix plate carriage and related parts. Fig. 2, is

a perspective view of the field shift, matrix plate elevator, stops arresting the vertical flight of the matrix plate, and the elevator releasing slide and related parts. Fig. 3, is a sectional elevation of the parts shown in Fig. 2, with a section of the keyboard added. Fig. 4, is a vertical section showing the stops arresting the horizontal flight of the matrix plate. Fig. 4^a is a perspective sectional view of the parts shown in Fig. 4, with a section of the keyboard attached, showing the operable connections between the character keys and the means stopping the flight of the matrix plate in a horizontal direction. Figs. 5 and 5^a, are perspective views showing the mold adjusting mechanism. Fig. 6, is a sectional elevation showing the matrix centering and stripping mechanism with the parts in their passive position. Fig. 7, is a similar view to Fig. 6, with the parts in their active position, additional parts being in section to show the matrix stripper. Fig. 8, is a sectional plan of part of the construction shown in Fig. 1. Fig. 9 is a detail of the clutch setting slide. Fig. 10 is a detail of the levers for the adjustment of the type body mold.

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

In my present invention, the construction of the keyboard a^5 is the same as that in my said Patent #1,002,212, and the cycle of operation originating with the pressing of a character key a^{10} results in the oscillation of the two rock shafts c^5 and c^6 and the actuation of two stop selectors c and c^{10}. The stop selector c sets a stop a for arresting the downward flight of the matrix plate t, and moves the elevator releasing slide o to disengage the detent pawl p from the elevator for the descent of the matrix plate until its flight is arrested by the selected stop a. The stop selector c^{10} releases the latch s^{15} from the drop bar s^3 which then descends, and actuating the bell crank s^{16}, sets the stop s^{10} to arrest the horizontal flight of the matrix plate. Thus, the action of the keyboard in setting two stops to arrest a two-way movement of the matrix in two directions in angular relation results in the selected character on the matrix plate being brought to the casting position.

The key board mechanism a^5 and stop selectors have been fully shown and described in my said patent and I intend using the same or similar means in connection with my present improvements.

In my said patent I have also shown the matrices of each field on the matrix plate to be arranged in seven horizontal rows with seven stops arresting the vertical flight of the matrix plate, one stop being permanently in the path of the matrix plate, and the other six being movable to be selectively projected into its path. For these fixed and movable stops I have substituted seven stopping pawls a rockably mounted on a shaft b and tensioned by springs d which, by engaging in notches d^5 in the hubs d^6 of the stopping pawls, prevent their vibration and any possibility of their dislodgment until actuated by the stop selectors c. When a character key is pressed, its respective stop selector engages its corresponding stopping pawl rocking it forward on the shaft until its free end is in the path of the stopping element e, operating vertically in a slideway h and pivotally suspended from an arm f rigidly fixed on the elevator rock shaft g. This stopping element is provided with a set of stops for each field of matrices, which in my said patent is shown to be two, and as my present improvements are to be substituted for corresponding parts therein, I have provided the stopping element e with two sets of stops i i', the set of stops i being for the upper matrix field and the other set i' for the lower matrix field. The stops of each set are stepped diagonally across the stopping element and correspond in position with their respective horizontal rows of matrices. As seven rows of matrix characters are shown in each field, I have provided seven stops in each set, the stops for the lower field being vertically below the corresponding stops for the upper field. I have also provided seven stopping pawls, to engage their corresponding stops in the operative set, so that when the field shift j is actuated, by the turning of the lever j^5 and rock-shaft j^6 to move the links j^7, as described in my said patent to bring either the upper or lower matrix field into operative relation with the type body mold, it correspondingly changes the relative position of the sets of stops i, i' to the stopping pawls viz:—if the field shift is actuated to bring the parts into the position shown in Fig. 2, the lower matrix field will be in operative relation with the type body mold, and the lower set of stops i' will have operative relation with the stopping pawls a, or if the field shift is actuated to bring the upper matrix field into operative relation with the type body mold, the upper set of stops i will have operative relation with the stopping pawls, the lower set of stops i' then being positioned below the heads of the stopping pawls so that the latter will not engage them. When a character key is pressed, the stop selector pushes its respective stopping pawl into the path of the stopping element and pushes the elevator releasing slide o forward until the slotted arm g' disengages the detent pawl p from the elevator slide q, which then descends. As the elevator slide q descends, it, through its pivotal connection r with the elevator rock shaft arms k, turns the latter, and through the

agency of the rock shaft g causes the downward movement of the arm f, until the positioned stopping pawl engages one of the stops and arrests the downward movement of the stopping element e. The stoppage of the downward flight of the stopping element arrests the turning movement of the arm f and rock shaft g and the downward movement of the elevator rock shaft arms k, and as the matrix plate is suspended from a shaft s carried by the arms k it follows that the arresting of the downward movement of the arms k effects a corresponding arrest of the downward flight of the matrix plate t, bringing the selected horizontal row of matrices into the same plane as the mold cavity of the type body mold.

The action of the above described parts may be summarized as follows: The pressing of a character key a^{10} sets two stops, viz: a and s^{10} to arrest the downward and horizontal flights of the matrix plate, and succeeding the setting of these stops, it moves the elevator releasing slide o to disengage the detent pawl p from the elevator so that the matrix plate can descend until its flight is arrested by the selected stop a. The elevator releasing slide o, as described in my said patent, through the agency of the clutch setting slide d', sets the clutch a^{15} for the revolution of the high speed shaft a', the clutch a^{15} being driven by a suitable gearing and motor. As the construction of the clutch is clearly shown and described in my said patent, it will not be necessary for me to describe it in detail in my present application. When the clutch is set, the high speed shaft starts its revolution, the cam a^{20} then releasing the cranked end a^{21} of the shaft a^{10} to which the arm a^4 is fixed, and as described in my said patent, tension springs a^{25} fixed to a bracket a^{26} projecting from the standard i'', cause the shaft a^{10} to rock and actuate the arm a^4 to propel the matrix plate carriage and with it the matrix plate in a horizontal direction until arrested by the positioned stops s^{10}. When the cast is made, the cam a^{20} engages the cranked end a^{21} of the shaft a^{10}, and rocking the shaft, returns the matrix plate carriage to its normal position for a succeeding action.

By the employment of the means above described, for arresting the downward flight of the matrix plate, I am enabled to obviate the disadvantages resulting from the impact of the edge of the matrix plate against a positioned stop, and the friction resulting from its movement thereon.

I have also in my said present invention provided the stopping pawls with a return mechanism consisting of a return element u fulcrumed intermediate its ends to a frame v bolted or otherwise fastened to the bed plate w, one end of the return element u bearing against the stopping pawls, and the other end being pivotally connected by a link x to a lever y, actuated by a cam z on the high speed shaft a'. The cam z is timed on the shaft a' to actuate the lever y and effect the return of the stopping pawls when the elevator slide is ascending and returning the matrix plate, and the stopping element to their elevated position, a spring b'' contained in the frame v and bearing against the return element u, pressing the latter and the link and lever into their passive position when the cam z disengages from the lever y so that the stopping pawls will be free to move into line with the stops on the next operation of the key board.

High-speed shaft.—I have also provided in my present invention a control to prevent the over-run of the high speed shaft at each operation of the keyboard. This control consists of a stop b' fixed on the shaft a' and engaging with a movable stop c' forming part of the clutch setting slide d' actuated by the elevator releasing slide o when pushed forward by the stop selector. The elevator releasing slide o then actuates a bell-crank o^{10} having one arm o^{15} engaging in a recess o^{12} in the elevator releasing slide and the other arm o^{13} engaging between the lugs o^{14} of the clutch setting slide d'. When a character key is pressed the stop selector moves the elevator releasing slide forward and, oscillating the bell-crank o^{10}, draws the clutch setting slide d' toward it, resulting in the withdrawal of the movable stop c' from the stop b' for the revolution of the shaft a'. During the revolution of the shaft a', the cam e', engaging with the arm f' restores the elevator releasing slide to its normal position, oscillating the bell-crank o^{10} to push the clutch setting slide away from the elevator releasing slide and set the movable stop c' to engage with the stop b' and prevent the overrun of the high speed shaft when it has completed its revolution, the cam e' continuing to engage the arm f' and thus control the operation of the elevator releasing slide, the keyboard, and the type producing means until the high speed shaft has completed its revolution and all the parts of the machine are correctly positioned for the casting of the succeeding character.

In my said patent I have shown the elevator releasing slide to be provided with an arm engaging a stud projecting from a spring tensioned detent pawl supporting the elevator slide. But I have found by experience in the field of actual use that a spring tensioned detent pawl is not reliable, and that frequently the elevator slide and matrix plate would be returned to their elevated position and descend again before the detent pawl would be positioned to arrest their downward flight. To obviate this I

have provided the elevator releasing slide *o* with a slotted arm *g'* in which operates a stud *h'* projecting from the detent pawl *p*. By this means I am able to positively effect the return of the detent pawl with that of the elevator slide, and position it to engage with the latter when the matrix plate and elevator slide are in their elevated position.

Matrix plate carriage. (See Figs. 1, 3, 6, 7, and 8.)—In my said patent I have shown and described how the matrix plate is moved into and out of engagement with the type body mold by the action of the shift plate, and how the selected matrix character is centered correctly with the mold cavity by a centering pin actuated by a lever moving under the influence of a cam revolving with the high speed shaft. I have found however that the movement of the shift plate can be avoided by providing for the lateral independent movement of the matrix plate carriage. This is accomplished by providing the standards *i''* with brackets *j'* and hinge pins k^5 on which are mounted oscillating arms *k'* carrying the grooved idlers *l'* supporting the matrix plate carriage *m'* and guiding its lengthwise movement. The swinging action of the oscillating arms is to allow of the lateral movement of the matrix plate carriage and matrix plate toward the type body mold, so that a metal tight joint will be made between the end of the mold cavity and the selected matrix character, and to permit of the movement of the matrix plate carriage away from the type body mold when the matrix character is stripped from the type cast by the operation of the machine, when the horizontal flight of the matrix plate to the type body mold is arrested and the selected character positioned opposite the mold cavity, the centering pin *o'* enters the corresponding recess *p'* in the reverse face of the matrix plate *t*, and under the influence of the presser plate *r'* and lever *q'* actuated by the cam *s'* revolving with the high speed shaft *a'*, centers the selected matrix character with the mold cavity *t'* and presses the matrix plate against the type body mold *u'*. In the reverse face of the matrix plate carriage, *i. e.* the face adjacent to the stops, is a lengthwise groove *v'*, in which is contained a tongued or rabbeted head *w'* of the matrix plate stripper *x'*.

The stripper shown in the accompanying drawings is of a tubular shape and through its bore the centering pin has lengthwise motion. In the stripper is a nut *y'* acting as a guide for the centering pin, and on the centering pin within the stripper tube is a shoulder *z'* bearing against the nut *y'*, and limiting the outward movement of the centering pin. Bearing against the shoulder *z'* and against a shouldered stop *a''* in the stripper tube is a spring *b''*.

The pressure of the plate *r'* and lever *q'* against the centering pin forces the pointed end of the latter forward into the recess *p'* for the selected matrix, and correctly positions that matrix opposite the mold cavity. This forward motion of the centering pin forces the matrix plate into contact with the type body mold, making with it a metal tight joint. This movement of the matrix plate carries with it the stripper *x'* compressing the spring *b''* against the shouldered stop *a''*. When the centering pin is released from the pressure of the lever *q'* the spring *b''* bearing against the shouldered stop *a''* operates to withdraw the centering pin from the recess *p'*. Then a lever *c''* operating under the influence of a push bar *d''* and cam *e''* and engaging with the stripper at *f''*, moves the latter in a direction away from the type body mold forcibly but carefully stripping the matrix plate from the type cast in the mold cavity.

Mold adjusting mechanism. (Figs. 1, 4, 5 and 5^a.)—In my said patent I have described how the type body size of the mold cavity is automatically adjusted by the action of a wedge and operating arm moving under the influence of a stepped wedge setting plate pressed forward into an operative position by drop bars suspended from the stops arresting the horizontal flight of the matrix plate, and I have also described how the operation of the keyboard withdraws the latch s^{15} from engagement with its respective drop bar s^3 so that the latter can descend and by an operable connection, consisting of the bell-crank s^{16}, positions the stop s^{10} to arrest the horizontal flight of the matrix plate carriage, and I have also described how the lifters s^{17} actuated by the plunger s^{18} raise the drop bars s^3, and how the drop bars s^3 as they are returned to their normal position actuate the bell-cranks s^{16} to withdraw the stop s^{10} from the path of the matrix plate carriage, and how the latch s^{15} engages and holds the drop bars s^3 until again released by the operation of the keyboard. These drop bars have lugs, on the opposite sides, one of which engages the wedge setting plate, and, the other being engaged by a spring tensioned plunger actuated by a pawl moving under the influence of a cam on the high speed shaft. The length of the lug engaging the wedge setting plate, corresponds with the width of the type body represented by the vertical row on the matrix plate brought into operative relation with the mold cavity by the drop bar s^3 of the stop s^{10} arresting the horizontal flight of the matrix plate, the return of the wedge setting plate and adjusting wedge to their passive position being effected by a spring s^9. I found however in the field of actual use that while the above construction operated satisfactorily to pro-

duce type bodies of different widths I had made no provision for interchanging the drop bars without removing the related parts, and I also found that the return action of the wedge was not positive.

In my present invention I employ the same arrangement of adjusting wedge l'', operating arm m'' and rock shaft o'', but instead of using the stepped wedge setting plate as in my said patent I use a wedge setting plate p'' which engages on one side with the drop bars q'' pivotally suspended from the drop bars s^3 and on the other side with a lug p^5 forming part of the arm m'', there being, however, no fixed connection between the plate p'' and the drop bars or lug. The drop bars q'' are in my present invention devoid of the lugs shown in my said patent to engage the wedge setting plate, but are provided with the usual lugs s'' engaged by the spring pressed plungers t'', the latter being actuated by pawls u'' fulcrumed upon a shaft v''. The pawls u'' are actuated by levers x'' provided with lugs z'' engaged by a cam a^3 mounted on the high speed shaft a'. The lugs z'' are of different lengths varying the stroke of the levers x'' and effecting a corresponding length of stroke of the plungers, drop bars and wedge setting plate, to determine the position of the adjusting wedge and the type body width of the mold cavity.

To change the length of the stroke of the plungers and related parts for increasing or decreasing the type body widths to correspond with the different sizes of the matrices when the matrix plate is interchanged, I have fulcrumed the levers x'' on the shaft y'' removably supported in its bearings y^3 to permit of the levers being interchanged with others whose lugs z'' may be of a different height to those then in use, the increase of the height effecting a corresponding increase, and the decrease of height effecting a corresponding decrease, of the type body width, the interchanging of the levers being effected by lifting the shaft y'' with its set of levers x'' from its bearings y^3 and replacing it with another shaft and set of levers, this being necessary when the matrix plate is changed for another matrix plate of different body sizes.

When a character key is pressed, the key board mechanism effects the release of a corresponding drop bar s^3 which with its suspended drop bar q'' descends as described in my said patent bringing the lug s'' into line with its respective plunger t''. The actuation of the key board mechanism then sets the high speed shaft in motion and during the rotation of the high speed shaft a' the cam a^3 depresses the levers x'' causing them to actuate the pawls u'' and force the plungers in the direction of the drop bars. The plunger corresponding to the released drop bar s^3 engages the lug s'' and forces its drop bar q'' against the wedge setting plate, which by its engagement with the operating arm positions the latter and the adjusting wedge to determine the type body width, the drop bars q'' suspended from the remaining drop bars s^3 retaining their passive position by reason of their lugs s'' being out of line with their corresponding plungers. To return the wedge setting plate and adjusting arm to their passive position the operating arm m'' is provided with a stud b^3 working in a slotted link c^3 having an arm d^3 engaged by a cam e^3 on the high speed shaft, so that during the revolution of the high speed shaft, the cam will engage the arm and move the link to return the adjusting wedge operating arm and wedge setting plate to their passive position, the action of the cam being timed to effect this return during the return of the drop bars to their elevated position. This movement for returning the adjusting wedge operating arm and wedge setting plate to their passive position is positive on every revolution of the high speed shaft.

The length of the slot in the link is sufficient to allow of the forward movement of the wedge setting plate and operating arm independent of any corresponding movement on the part of the link, and when the link is relieved of the influence of the cam it is returned to its neutral position by a spring f^3 so that the stud will be able to move forward in the slot.

From the foregoing description it will be understood that the elevator releasing slide o and the cam e' constitute a control for the machine by locking off the action of the keyboard, and by it the subsequent action of the matrix plate and its related parts until the shaft a' has completed its revolution and has come to a normal position, the elevator releasing slide also constituting a control to effect the release of the clutch and the setting of the stop to prevent the overrun of the shaft.

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

1. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a two-way moving matrix plate, and a stopping element coöperating with one set of keyboard adjusted stops to arrest a one-way movement of the matrix plate.

2. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a matrix plate having movement in two directions in angular relation, and a stopping element coöperating with one set of the keyboard adjusted stops to arrest the movement of the matrix plate in one direction, the ma-

trix plate having movement in the other direction independent of the stopping element.

3. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a two-way moving matrix plate, a stopping element coöperating with one set of the keyboard adjusted stops to arrest a one-way movement of the matrix plate from its normal position, and means to restore the matrix plate to its normal position.

4. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a two-way moving matrix plate, a stopping element coöperating with one set of the keyboard adjusted stops to arrest a one-way movement of the matrix plate, and means for returning the keyboard adjusted stops.

5. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a two-way moving matrix plate, a stopping element coöperating with one set of the keyboard adjusted stops to arrest a one-way movement of the matrix plate, and means for tensioning the keyboard adjusted stops.

6. In a type casting machine, a keyboard, a shaft, and a control for the keyboard, the shaft having operable connection with the control to prevent the subsequent operation of the keyboard until the shaft shall have completed its cycle of movement.

7. In a type casting machine, a keyboard, a shaft, and a control for the shaft actuated by the keyboard, the shaft having operable connection with the control to prevent the subsequent operation of the keyboard until the shaft shall have completed its cycle of motion.

8. In a type casting machine, a shaft, a matrix plate movable from a normal to a casting position, a keyboard, and a control for the matrix plate and shaft actuated by the keyboard, said control locking off the subsequent action of the keyboard until the matrix plate shall have been returned to its normal position.

9. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a keyboard, and two sets of stops operably connected with the keyboard whereby the movement of the matrix plate is controlled by the keyboard through the selection of a stop from each set coincident with the operation of a character key, and a stopping element coöperating with one set of stops to arrest a one-way movement of the matrix plate, the matrix plate moving in one direction with the stopping element and in the other direction independently of it.

10. In a type casting machine a shaft, a keyboard, a matrix plate elevator, and a control for the shaft and matrix plate elevator actuated by the keyboard, said control locking off the subsequent action of the keyboard until the shaft shall have completed its revolution and come to its normal position.

11. In a type casting machine, a reciprocating matrix plate carriage, and oscillating arms supporting and guiding the reciprocating movement of the matrix plate carriage and permitting its lateral movement, the matrix plate carriage having a sliding connection with the oscillating arms independent of their movement.

12. In a type casting machine, a reciprocating matrix plate and an oscillating support guiding the reciprocating movement and permitting the lateral movement of the matrix plate, the matrix plate having a sliding connection with the support independent of the oscillating movement.

13. In a type casting machine, a reciprocating matrix plate carriage, oscillating arms guiding the reciprocating movements of the matrix plate carriage, and a stripper, the matrix plate carriage having a sliding connection with the stripper for the presentation of the selected character at the casting position, and operable means actuating the stripper for the retraction of the matrix plate carriage when the cast is made.

14. In a type casting machine, a reciprocating matrix plate, oscillating arms for the lateral movement of the matrix plate to the casting position, the matrix plate having a sliding connection with the oscillating arms independent of their movement, and an operable centering pin correctly positioning the matrix plate for the reproduction of the selected character.

15. In a type casting machine, a matrix plate, oscillating arms for supporting and permitting the lateral movement of the matrix plate to the casting position, an operable centering pin correctly positioning the matrix plate for the reproduction of the selected character, and a stripper for the matrix plate actuated to retract the matrix plate when the cast is made, the matrix plate having a sliding connection with the oscillating arms independent of their movement.

16. In a type casting machine, a mold setting wedge, a wedge setting plate to position the wedge, a set of matrix plate arresting stops, drop bars adjusted by the stops, plungers actuating the drop bars, pawls for the plungers, levers actuating the pawls, a high speed shaft, and a cam for the high speed shaft actuating the levers and automatically adjusting the wedge to the required type body size.

17. In a type casting machine, a mold setting wedge, a wedge setting plate to position the wedge, a set of matrix plate arresting stops, drop bars adjusted by the stops, plungers actuating the drop bars, pawls for the plungers, levers actuating the pawls, a high speed shaft, a cam for the

high speed shaft actuating the levers and automatically adjusting the wedge to the required type body size, a shaft for the levers, and means for removably supporting the shaft whereby the levers can be collectively interchanged.

18. In a type casting machine a type body mold, a matrix plate movable in two directions, stops arresting the two way movement of the matrix plate, means supporting the matrix plate in an inoperative position consisting of a matrix plate elevator and a pivoted detent having a projecting stud, means to release the supporting means consisting of a releasing slide and a slotted arm engaging with the stud, and a key board actuating the stops and releasing slide.

19. In a type casting machine, a keyboard, a two-way moving matrix plate, two sets of stops adjusted by the keyboard controlling the movement of the matrix plate in two directions and a stopping element coöperating with one set of keyboard adjusted stops to arrest a one-way movement of the matrix plate.

20. In a type casting machine, a matrix plate movable in two directions, a keyboard, two sets of stops adjusted by the keyboard and a stopping element coöperating with one set of keyboard adjusted stops to arrest a one-way movement of the matrix plate, the matrix plate moving in one direction with the stopping element, and in the other direction independently of it.

21. In a type casting machine, a matrix plate having two or more fields of matrix characters and movable in two directions in angular relation, two sets of key board adjusted stops, and a stopping element having a set of stops for each matrix field, each capable of being brought into operative relation with one set of keyboard adjusted stops to arrest the movement of the matrix plate in one direction.

22. In a type casting machine, a matrix plate having two or more fields of matrix characters and movable in two directions in angular relation, two sets of keyboard adjusted stops, and a stopping element having a set of stops for each matrix field, each capable of being brought into operative relation with one set of keyboard adjusted stops to arrest the movement of the matrix plate in one direction.

23. In a type casting machine, a keyboard, a matrix plate suspended to move in two directions in angular relation, two sets of stops adjusted by the keyboard to arrest the movements of the matrix plate, and a stopping element suspended to move in one direction with the matrix plate, one set of the keyboard adjusted stops coöperating with the stopping element to arrest a one-way movement of the matrix plate.

24. In a type casting machine, a matrix plate movable in two directions in angular relation, a keyboard, two sets of stops adjusted by the keyboard arresting the movements of the matrix plate, and a stopping element movable with the matrix plate and coöperating with one set of the keyboard adjusted stops to arrest the movement of the matrix plate in one direction.

25. In a type casting machine, a keyboard and a controlling slide actuated thereby; a shaft and a cam mounted thereon to cause the retraction of the controlling slide until the shaft has effected a revolution and come to a normal position.

26. In a type casting machine, a keyboard, a shaft, a clutch, a clutch control, operable by the keyboard, and a control for the keyboard positioned by the shaft locking off the action of the keyboard until the revolution of the shaft is effected.

27. In a type casting machine, in combination, a mold, a matrix plate carriage movable in a path parallel to the mold, oscillating arms guiding the movement of the matrix plate carriage and permitting its movement to and from the mold, the matrix plate carriage having sliding movement independent of the movement of the oscillating arms, a centering pin moving the matrix plate carriage laterally to present a selected matrix character to the mold, and an operable stripper causing the retraction of the matrix plate carriage when the cast is made.

28. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a two-way moving matrix plate, a movable supporting element for the matrix plate, and a stopping element coöperating with one set of the keyboard adjusted stops to arrest the movement of the movable supporting element.

29. In a type casting machine, a keyboard, two sets of stops adjusted by the keyboard, a two-way moving matrix plate, a movable supporting element for the matrix plate, the matrix plate moving unitedly in one direction with the movable supporting element and in the other direction independently of it, and a stopping element coöperating with one set of the keyboard adjusted stops to arrest the movement of the movable supporting element.

30. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a keyboard, two sets of stops operably connected with the keyboard whereby a stop may be selected from each set coincident with the operation of a character key, and a stopping element coöperating with one set of stops to arrest a one-way movement of the matrix plate.

31. In a typographic machine in which the types are cast from a matrix plate mov-

able to the casting position in two directions in angular relation, in combination, a keyboard, two sets of stops operably connected with the keyboard whereby a stop may be selected from each set coincident with the operation of a character key, a stopping element coöperating with one set of stops to arrest the movement of the matrix plate in one direction, the matrix plate having movement in the other direction independently of the stopping element.

32. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a matrix plate, a keyboard, two sets of stops operably connected with the keyboard, to bring the matrix plate to the casting position, and laterally yielding means supporting and guiding a one-way movement of the matrix plate and providing for its lateral movement in angular relation to its two-way movement.

33. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a matrix plate, a keyboard, two sets of stops operably connected with the keyboard to bring the matrix plate to the casting position, and laterally yielding means supporting and guiding a one-way movement of the matrix plate and providing for its lateral movement in angular relation to its two-way movement, the matrix plate having a sliding connection with the supporting and guiding means for its movement to one set of said stops.

34. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a matrix plate, a keyboard, two sets of stops operably connected with the keyboard, to bring the matrix plate to the casting position, laterally yielding means supporting and guiding a one-way movement of the matrix plate and providing for its lateral movement in angular relation to its two-way movement, and means to retract the matrix plate from the casting position when the cast is made.

35. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a matrix plate, a keyboard, two sets of stops operably connected with the keyboard to bring the matrix plate to the casting position, laterally yielding means supporting and guiding a one-way movement of the matrix plate and providing for its lateral movement in angular relation to its two-way movement when at the casting position, said matrix plate having a sliding connection with the retracting means.

36. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a matrix plate, a keyboard, two sets of stops operably connected with the keyboard to bring the matrix plate to the casting position, laterally yielding means supporting and guiding a one-way movement of the matrix plate and providing for its lateral movement in angular relation to its two-way movement when at the casting position, and means to correctly center the matrix plate for the reproduction of the selected character.

37. In a typographic machine, a shaft, a keyboard, a controlling slide operably connected with the keyboard by means of which the shaft is set in motion, means to arrest the revolution of the shaft operably connected with the controlling slide, whereby the operation of a character key actuating the controlling slide to set the shaft in motion, will render said arresting means inoperative, and means associated with the shaft to restore the controlling slide and arresting means to their normal position as the shaft revolves, so that its revolution will be arrested when it has come to a normal position.

38. In a typographic machine in which the types are cast from a matrix plate movable to the casting position, in combination, a type body mold, a keyboard, a set of stops operably connected with the keyboard whereby the movement of the matrix plate is controlled by the keyboard through the selection of a stop coincident with the operation of a character key, means for determining the type body size of the mold having operative relation with the stops, and interchangeable means for actuating the size determining means.

39. In a typographic machine in which the types are cast from a matrix plate movable to the casting position, in combination, a type body mold, a keyboard, a set of stops operably connected with the keyboard to control its movement through the selection of a stop coincident with the operation of a character key, means for determining the type body size of the mold adjusted through the setting of a stop, and interchangeable means for actuating the size determining means.

40. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a keyboard, two sets of stops operably connected with the keyboard whereby a character key coincident with its operation will se-

lect a stop from each set to bring the selected character on the matrix plate to the casting position, operable means for causing the movement of the matrix plate, and a control for the matrix plate moving means actuated by the keyboard, said control locking off the succeeding action of the keyboard until the matrix plate moving means has completed its cycle of action.

41. In a typographic machine in which the types are cast from a matrix plate movable in two directions to the casting position, in combination, a keyboard, a matrix plate, means for effecting the movement of the matrix plate, and a control for the matrix plate moving means actuated by the keyboard, said control preventing the subsequent operation of the keyboard until the matrix plate completes its cycle of movement.

42. In a typographic machine in which the types are cast from a matrix plate movable in two directions to the casting position, in combination, a keyboard, a matrix plate, means for effecting the movement of the matrix plate to the casting position, and a control for the matrix plate moving means actuated by the keyboard, said control locking off the subsequent action of the matrix plate moving means until the matrix plate has been restored to its normal position.

43. In a typographic machine in which the types are cast from a tensioned matrix plate movable in two directions to the casting position, in combination, a keyboard, a matrix plate, a control for the movement of the matrix plate actuated by the keyboard to release the matrix plate for its two-way movement, said control preventing a succeeding release of the matrix plate until its cycle movement is completed.

44. In a typographic machine in which the types are cast from a matrix plate movable to the casting position in two directions in angular relation, in combination, a keyboard, a matrix plate, operable means for actuating the matrix plate, and a control for said operable means actuated by the keyboard, said control preventing the subsequent action of the keyboard until said operable means completes its cycle of action.

Brooklyn, New York, May 21st, 1910.

ERNEST B. BARBER.

Signed in the presence of—

W. S. SCUDDER,

M. KAZMAREK.