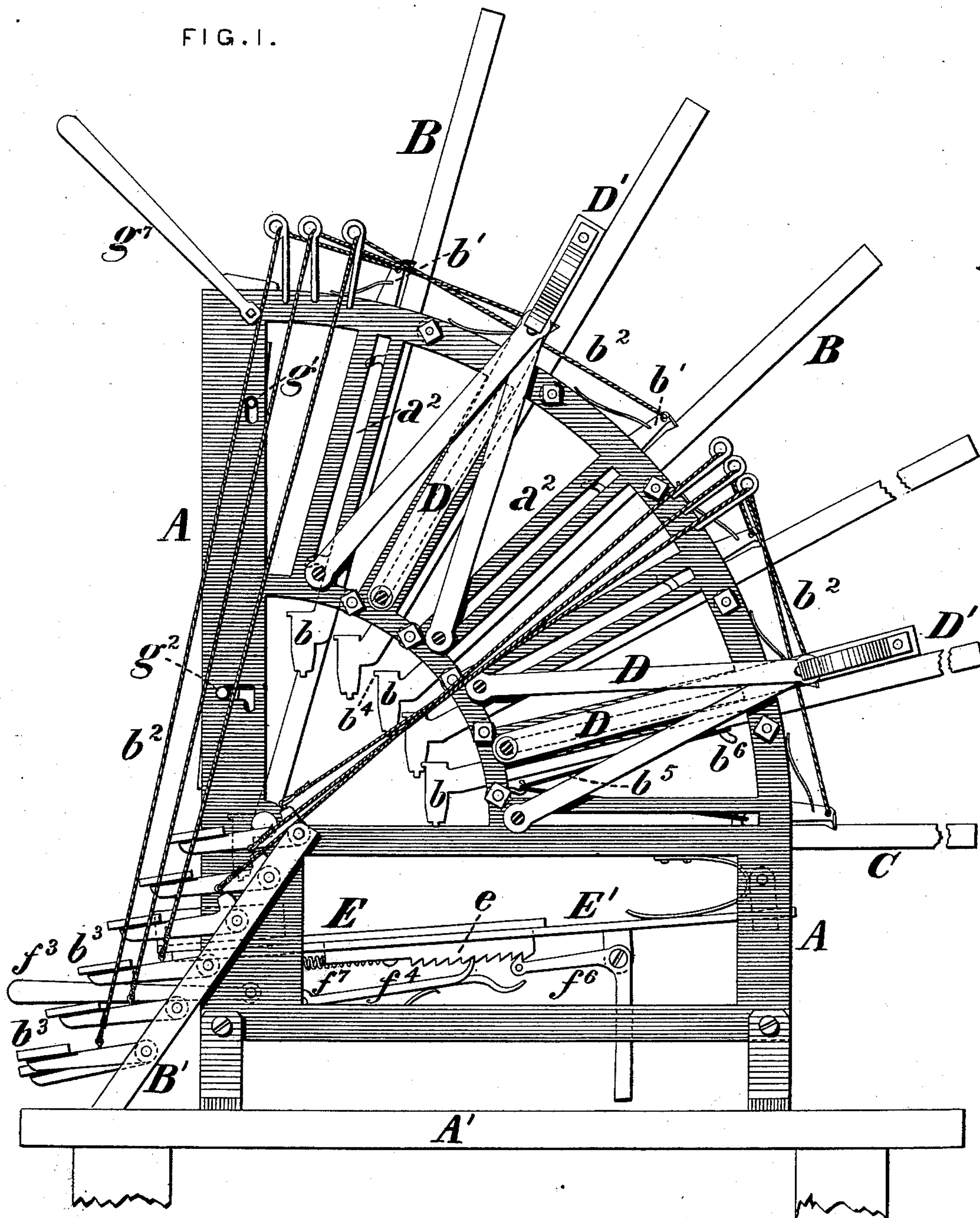


J. W. SCHUCKERS.
Machine for Making Stereotype Matrices.
No. 222,642. Patented Dec. 16, 1879.

FIG. 1.



WITNESSES.

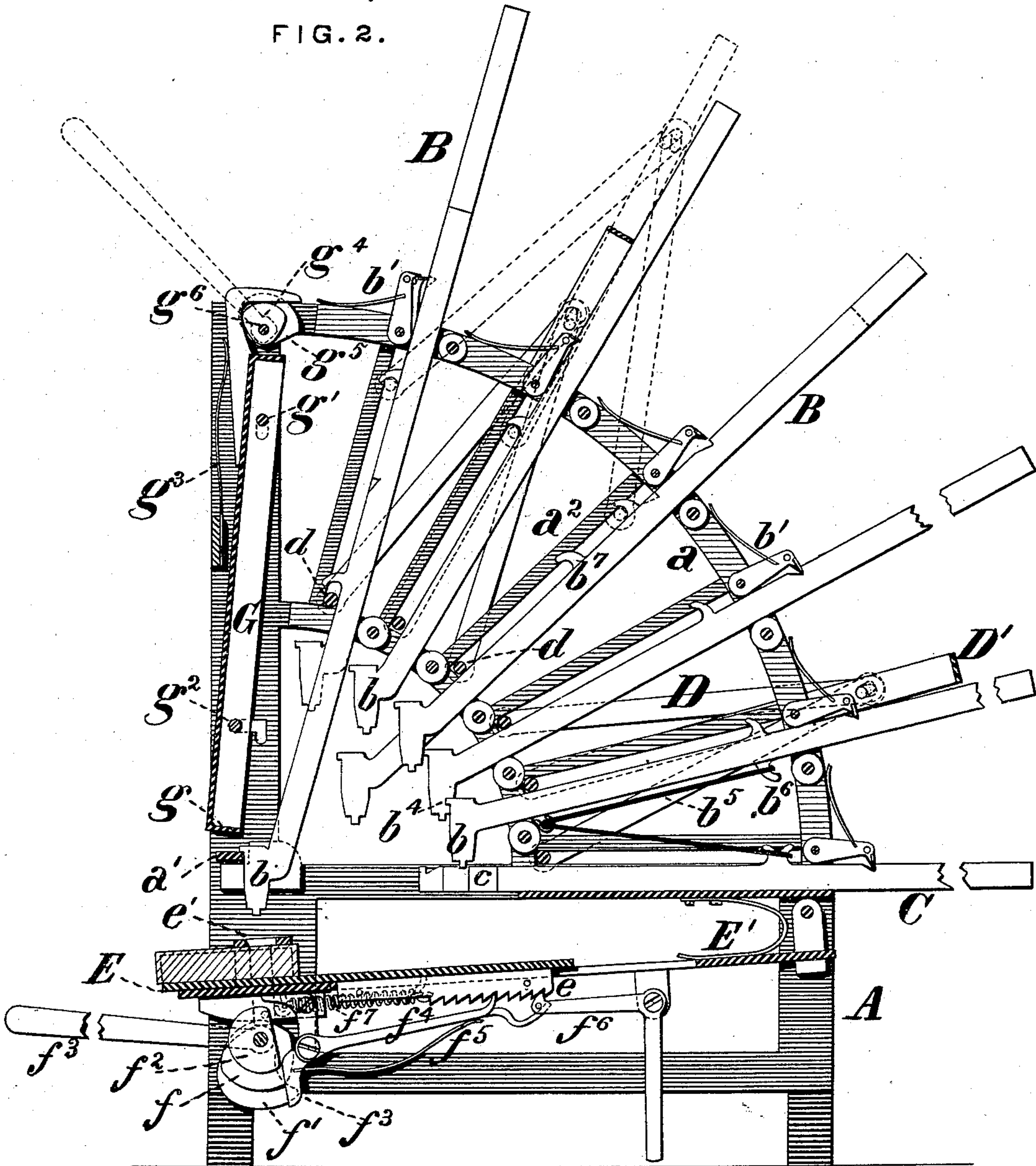
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FIG. 2.



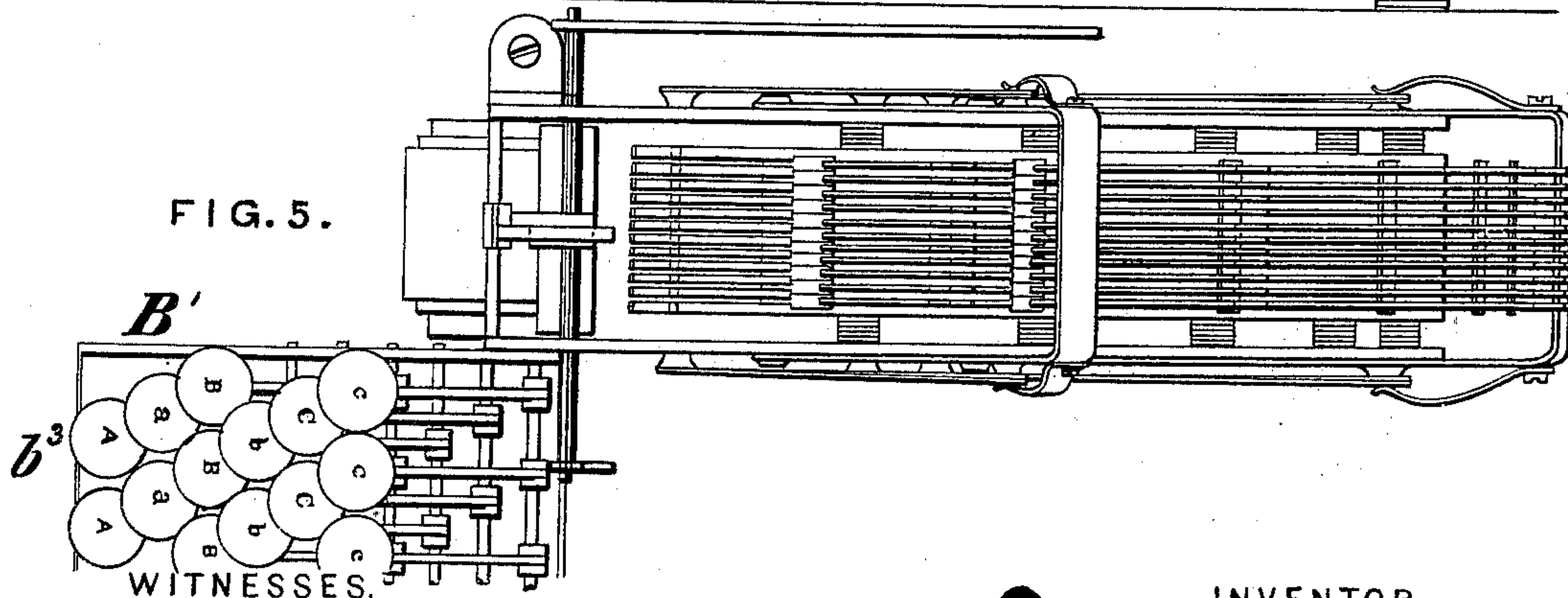
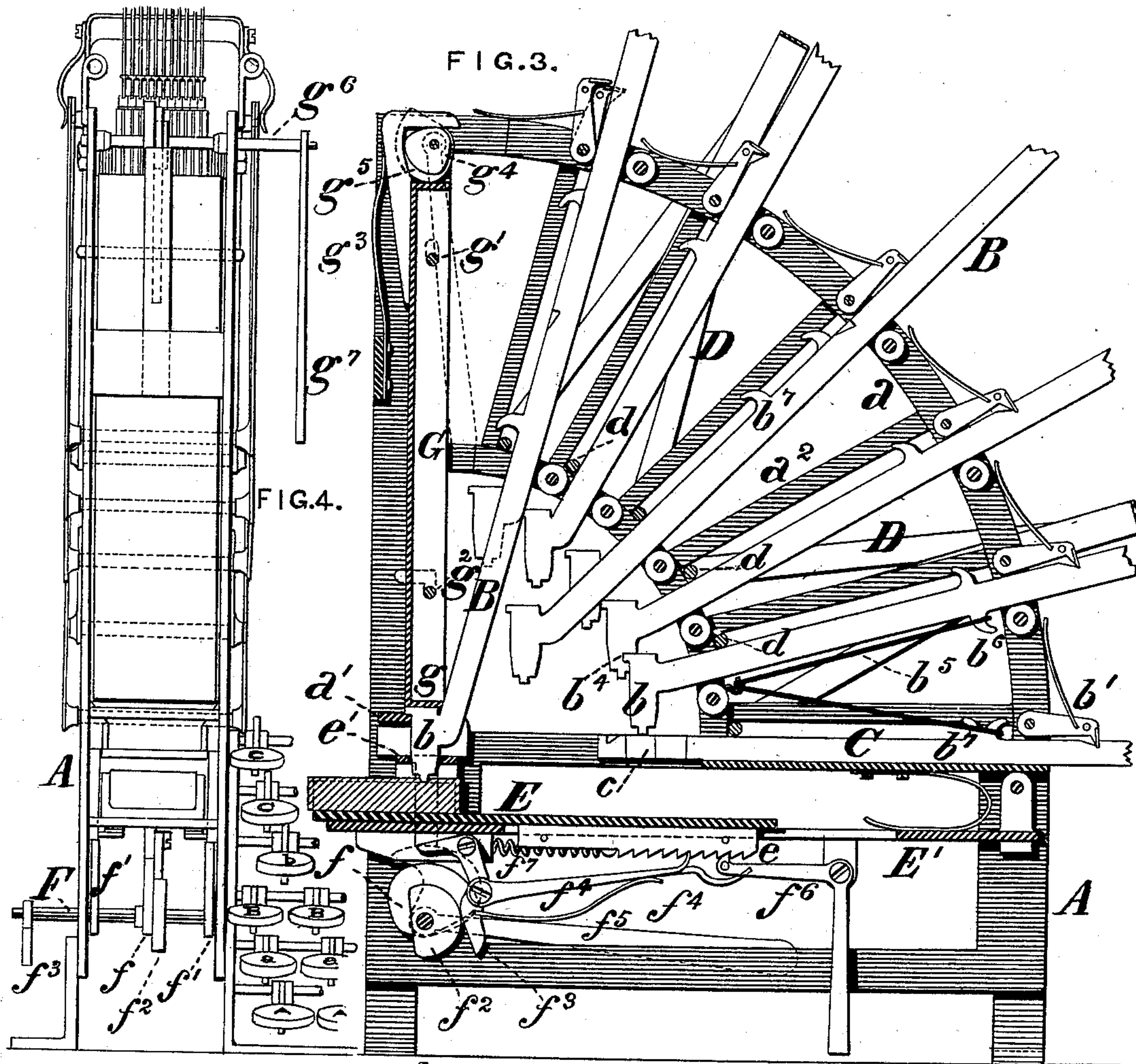
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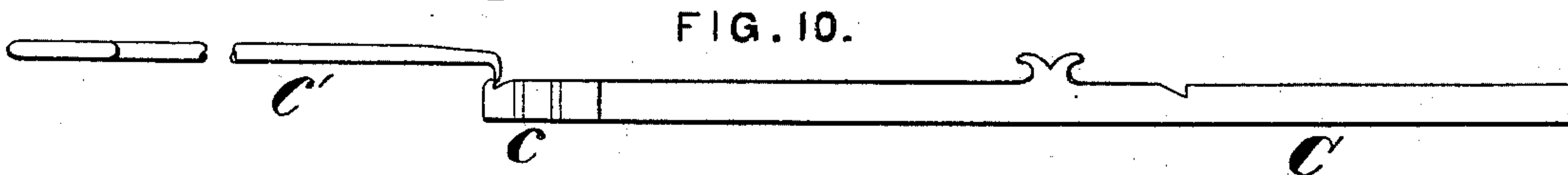
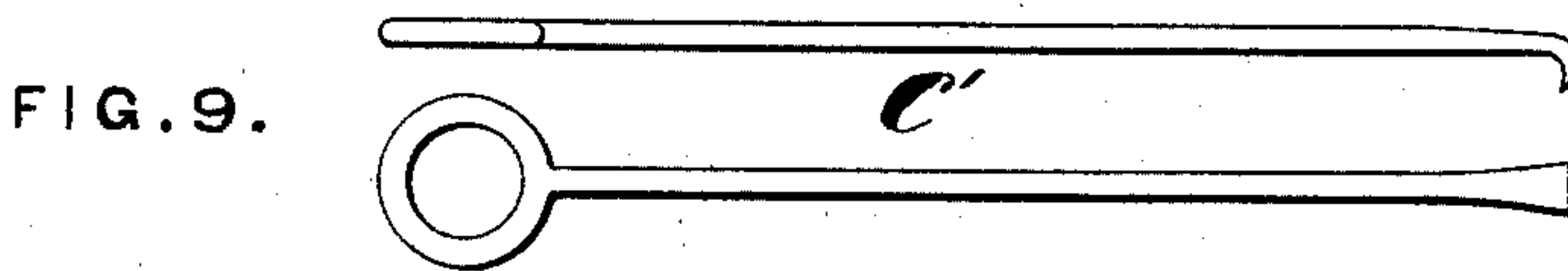
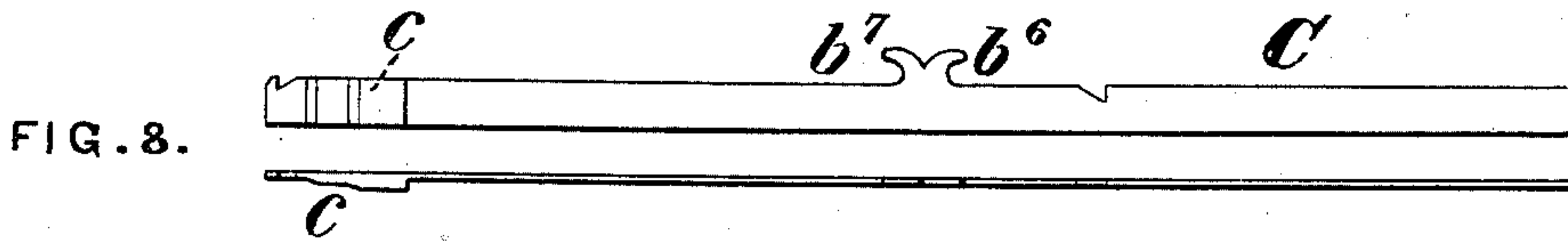
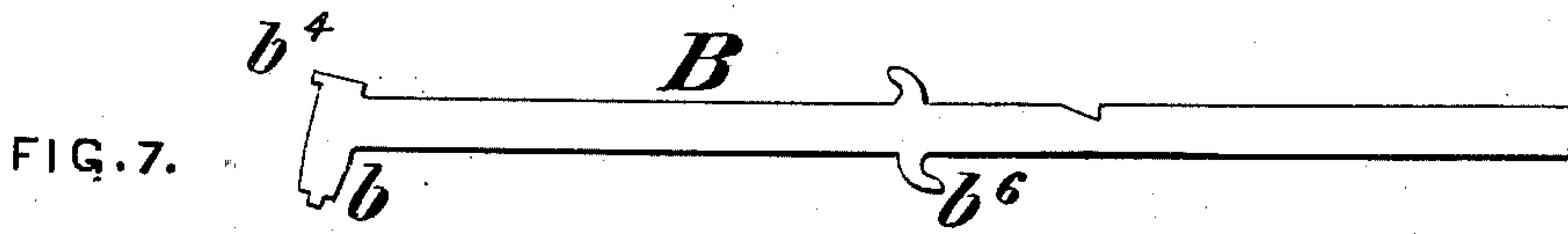
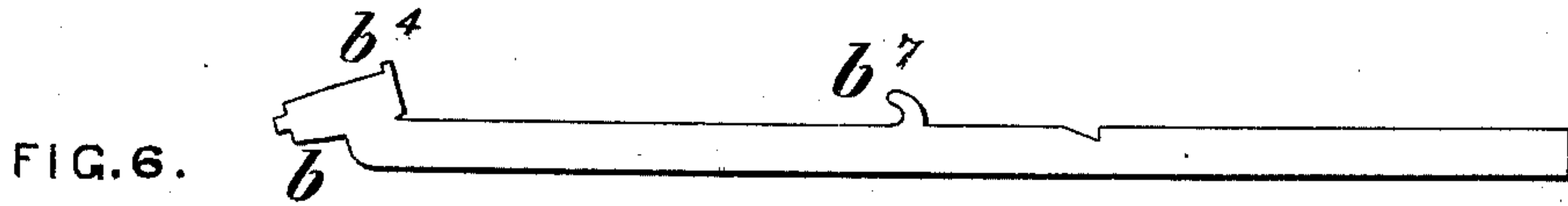


FIG. 11.

A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I	I
J	J	J	J	J	J	J	J	J	J
K	K	K	K	K	K	K	K	K	K
L	L	L	L	L	L	L	L	L	L
M	M	M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N	N	N

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UNITED STATES PATENT OFFICE.

JACOBS W. SCHUCKERS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
JOHN H. OBERLY, TRUSTEE, OF SPRINGFIELD, ILLINOIS.

IMPROVEMENT IN MACHINES FOR MAKING STEREOTYPE-MATRICES.

Specification forming part of Letters Patent No. **222,642**, dated December 16, 1879; application filed April 28, 1879.

To all whom it may concern:

Be it known that I, JACOBS W. SCHUCKERS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Machines for Forming Printers' Matrices for Stereotype-Plates, of which improvements the following is a specification.

The object of my invention is to provide, in a machine of simple and inexpensive construction, means whereby metallic types or dies may be speedily and accurately arranged or composed in the rotation and position required to form any desired line of printers' matter, and immediately thereafter be impressed into a block of wood or other suitable material to form an intaglio reproduction of said line, proper to serve as a matrix for stereotyping.

My invention further comprehends the provision in such machine of means for the successive and continuous repetition of the above operations in the proper sequence required for the production of a matrix containing a column or series of lines; and to these ends my improvements consist in certain novel devices and combinations hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side view, in elevation, of a machine for forming matrices embodying my improvements; Fig. 2, a vertical longitudinal central section through the same, the parts being shown in the positions occupied during the composition of the line; Fig. 3, a similar section with the parts shown in the positions occupied at the completion of an impression of a line in the matrix-block; Fig. 4, a front elevation, and Fig. 5 a plan or top view, of the machine; Figs. 6 and 7, views in elevation of two of the die or type arms; Fig. 8, side and top views of one of the justifying-arms; Fig. 9, top and side views of the justifying-hook; Fig. 10, a side view in elevation, showing the application of the justifying-hook to one of the arms; and Fig. 11, a diagram explanatory of the arrangement of the several tiers of die-arms and the manner of selecting the dies in composing a line.

To carry out my invention, I provide two

vertical frames or housings, A, the outline of each of which is substantially in form of a sector, and which are secured upon a bed-plate, A', at such distance apart as to admit of the introduction between them of a matrix-holder suited to receive a block of the proper width for the length of the line to be composed.

The various letters and characters required are formed upon the lower sides of dies or types *b*, each firmly united to a die-arm, B, of flexible metal, as spring-steel. The die-arms B, with their attached dies, are arranged between the housings A A in transverse tiers, and in the position of radii to the sector-shaped frames, the dies of each respective transverse tier being all set at the same angle upon the several arms thereof, and all bearing the same letter or character, subject to the modification that with respect to the letters or characters least often employed two different letters or characters may be arranged in the same tier where desired.

The rule which governs the angle at which dies of all the tiers are adjusted and secured upon their respective arms is, that the top and bottom of every die shall have the same relation as to parallelism with the base-line of the machine, so that any die of the series, when lowered into its desired position in composing the line, as hereinafter described, shall stand in the same horizontal plane as all the other dies of the line, whether the same be all taken from one transverse tier or, as is almost always the case, be selected arbitrarily from several tiers.

The die-arms B of each of the tiers are supported between curved partitions *a*, corresponding in form to the segmental portions of the frames A, by pivoted spring-latches or stop-levers *b'*, each of which engages a notch or recess formed in the side of one of the die-arms, and is withdrawn therefrom to permit of the descent of the arm when desired to set its die in the line to be composed by a cord, *b*², passing through an eye or over a guide or sheave and connected to a pivoted key, *b*³, on a key-board or table, B'. The die-arms B, when released by their respective spring-

latches, descend until their dies occupy the same position horizontally as that of the die nearest the left in Figs. 2 and 3, in which position they are arrested and supported by a transverse bar or rest, a' , secured to the frames and engaging a stop or shoulder, b^4 , formed on the top of each of the dies. The descent of the dies, when released, is effected by their own gravity, superadded to that of their arms in the tiers, whose arms sufficiently approach a vertical line to enable the action of gravity to be effectively exerted, and otherwise is, wherever necessary, effected either wholly or partially by the tension of springs b^5 connected to hooks b^6 on the arms and to the frame or partitions a .

The diagram, Fig. 11, indicates the manner of composing a line, each letter or character being selected upon the key-board, and its corresponding die-arm and die dropped into position by actuating the appropriate key, the rule governing this operation being that in every instance the letter or character of each tier which is nearest to the left, so far as is admissible by the previous character or characters delivered, is selected.

The necessary blank spaces are formed and the justification of the line effected by means of a tier of justifying-arms, C , mounted between the frames similarly to the die-arms, but in a substantially horizontal position, each of said justifying-arms having two or more blank dies, c , of relatively-increasing thickness, formed on or secured to its end adjacent to the dies b , said blank dies being connected one to the other by inclined or curved surfaces, as shown in the plan, Fig. 8. In composing the line the outermost and narrowest of these blank dies are employed, and the blanks in the line can be increased, as the justification may require, by drawing one or more of the wider blank dies into the line by the justifying-hook C' , which engages a notch formed in each of the justifying-arms near its end. The flexibility of the die-arms B enables this operation to be effected by admitting of the slight degree of displacement of the characters previously set in line, ensuing from the change of their position by the increase in width of a space or spaces.

After the impression of the composed line has been made, as presently to be described, the die-arms and justifying-arms are returned to their former positions in readiness for use in the succeeding line by transverse lifter-rods d sliding in radial guides a^2 on the frame, each parallel to the line of traverse of the die-arms of one of the tiers, the lifter-rods being connected by links D with transverse hand-pieces D' outside of the frames and engaging hooks or projections b^7 on the die-arms and justifying-arms.

The block of wood or other material into which the composed lines are to be impressed is secured in a matrix-holder, E , mounted, with the capacity of longitudinal movement, on a

plate, E' , pivoted at the end farthest from the point of delivery of the dies to the frames A . A downwardly-projecting tongue or projection, e , on the matrix-holder passes through a slot in the plate E' , and, besides serving to guide the matrix-holder in its traverse along the plate, is provided with a series of ratchet-teeth, through which movement in one direction is imparted to the holder. A transverse guide, e' , having a beveled or inclined sided slot of sufficient capacity to receive the dies of an entire line, rests upon vertical supports formed on the matrix-holder, and has upon each of its ends a downwardly-projecting arm working in guides on the side of the plate E' . The lower ends of the dies B are beveled correspondingly with the slot of the guide e' , so as to fit accurately therein when the guide is elevated to inclose the dies of the composed line, which elevation is effected at first coincidently with that of the matrix-holder on which it rests, as the latter is moved into position to receive the impression, by a cam, f , secured centrally upon a horizontal cam-shaft, F , mounted in bearings in the frames A below the plate E' , and in line vertically with the dies as set. The further elevation of the guide e' is effected by side cams, f' , on the shaft F , which bear against the downwardly-projecting arms of the guide and raise the same until the guide e' embraces the dies forming the line, and thereby insures the accurate alignment thereof.

The pressure by which an impression of the composed line is formed in the block is imparted by the center cam, f , by which the block secured in the matrix-holder is forced against the line of dies. Power is communicated to the cam-shaft F through the lever f^3 , the guide e' being elevated more rapidly, so as to previously align the dies by the action of the side cams, f' , and the applied pressure is received by a stationary abutment, g , upon the lower end of a vertical bar or frame, G , suspended between the frames A , above the dies, upon pins g' g^2 , fitting, respectively, in vertical and angular slots in the frames A . During the composition of the line the frame G is maintained in the inclined position shown in Figs. 1 and 2 by a spring, g^3 , bearing against a projection on its upper end and against a cross-bar on the frames A , so as to admit of the proper delivery of the dies, and upon the completion of the line the frame G is forced inward and downward to the vertical position shown in Fig. 3, with the stationary abutment g bearing on the top of the line of dies by cams g^4 g^5 on a shaft, g^6 , operated by a lever, g^7 , the cams bearing, respectively, against the upper projection of the frame G and the top of said frame, and the pins g' g^2 moving in their slots in correspondence with the traverse of the frame.

The matrix-holder E is traversed along the plate E' at each elevation for a distance equal to that between the centers of two adjacent

lines, so as to impart the proper longitudinal feed to the matrix-block to receive the impression of the composed line. In this instance the mechanism employed consists of a cam, f^2 , on the shaft F, which bears against a lever, f^3 , pivoted to a projection on the lower side of the matrix-holder, to which lever a pawl-lever, f^4 , is in turn pivoted. The pawl-lever f^4 is pressed up to the ratchet-teeth of the projection e of the matrix-holder, and the lever f^3 to the cam f^2 , by a spring, f^5 ; and a spring-pawl, f^6 , pivoted to the bottom of the plate E', and engaging the ratchet-teeth of the projection e , maintains the matrix-holder in position during the retraction of the lever f^4 .

Upon the completion of the traverse admitted by the number of teeth in the projection e , the matrix-holder is returned to the position originally occupied, by a spring, f^7 , upon the withdrawal of the lever f^4 and spring-pawl f^6 .

In the operation of the machine it will be observed that the composition and justification of each line are entirely independent of the impression thereof upon the matrix-block, so that, in addition to the economy in time as compared with the method of separately impressing each individual letter as delivered, heretofore proposed in matrix-machines, increased accuracy of work and a material simplification of mechanism are attained. Moreover, the application of the pressure required to form the impression in the block to the entire line at a single operation tends to a closer approximation to uniformity in depth in the completed matrix than is practicable where the separate characters are separately impressed, the attainment of which result is of prime importance in determining the practical value of a machine-made matrix.

I am aware that the method of forming a stereotype-matrix by the separate impression of dies or types into a block or mold of soft material is not new, such method being described and claimed in the patent of J. McElheran, No. 20,081, April 27, 1858.

I am further aware that it has been proposed to form a mold or matrix by first composing or setting up a line of type-dies, and subsequently impressing the composed line into a block of clay or other soft or plastic material, as is set forth in the patent of J. Paulding, No. 52,073, January 16, 1866.

I do not therefore claim said processes, or either of them, as my invention; nor do I broadly claim a machine or mechanism for producing a matrix-block by the application of either of said processes.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, in a machine for making stereotype-matrices, of a segmental supporting-frame, a series of rows of die or type arms, each carrying a letter or character die which is beveled or inclined at and near its lower end, and a series of blank justifying-

arms, all arranged in said supporting-frame radially to a common axis or line of delivery, a stationary rest which receives and sustains a line of type-dies when released from their positions in the supporting-frame, and a slotted lower guide having beveled or inclined sides, said guide inclosing the delivered line of type-dies and insuring the alignment thereof prior to its impression into a matrix-block, substantially as set forth.

2. The combination, in a machine for making stereotype-matrices, of composing mechanism, substantially as described, a stationary rest receiving and supporting a line of delivered type-dies, an abutment which may be adjusted to bear upon the top of said delivered line, a matrix-holder and matrix-block movable toward and from said line, a slotted guide for insuring the correct alignment of said line, and a shaft and cams by which said slotted guide is elevated to inclose said line, and an impression of said line subsequently formed in the matrix-block, substantially as set forth.

3. The combination, in a machine for making stereotype-matrices, of a segmental supporting-frame, a series of tiers or rows of die or type arms, and a series of justifying-arms arranged radially in said frame, and operated by gravity or by the tension of springs, or both, a key-board and connected mechanism for separately delivering said arms, and a series of lifters, each of which is mounted so as to slide in the supporting-frame parallel to the line of movement of the arms of one of the tiers, and by which all the delivered arms of one or more tiers may be simultaneously elevated and returned to their positions in the supporting-frame, substantially as set forth.

4. The combination, in a machine for making stereotype-matrices, of a supporting-frame, a stationary rest receiving and supporting a line of type-dies, a movable bar or frame carrying an abutment which can be adjusted to bear upon the top of the line of type-dies, a matrix-holder supporting a matrix-block of wood or other material, and resting upon a plate which is movable toward and from the line of type-dies, and a shaft and cam by which the matrix holder and block are pressed up to the face of the line of type-dies and an impression thereof formed in the matrix-block, substantially as set forth.

5. The combination, in a machine for making stereotype-matrices, of a frame, a stationary rest thereon supporting a line of type-dies, a slotted guide to inclose and insure the correct alignment of the type-dies, and a shaft and cams by which said guide is first clamped upon the line of type-dies, and thereafter an impression of the line of type-dies is formed in a matrix-block, substantially as set forth.

6. The combination, in a machine for making stereotype-matrices, of a composing mechanism, substantially as described, a stationary rest supporting a line of composed type-dies, an abutment adjusted to bear upon the top of

said line of type-dies, a matrix-holder and matrix-block mounted upon a guide-plate movable toward and from said line of type-dies, feed-gear for traversing the matrix-holder longitudinally upon the guide-plate, and a shaft and cams by which an impression of the line of type-dies is formed in the matrix-block and

the matrix-holder moved for a determined distance upon the guide-plate in correspondence with each impression, substantially as set forth.
J. W. SCHUCKERS.

Witnesses:

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GEO. A. VAILLANT.