

970,195.

G. W. DONNING.  
BOOK TYPE WRITER.  
APPLICATION FILED JUNE 6, 1899.

Patented Sept. 13, 1910.  
11 SHEETS—SHEET 1.

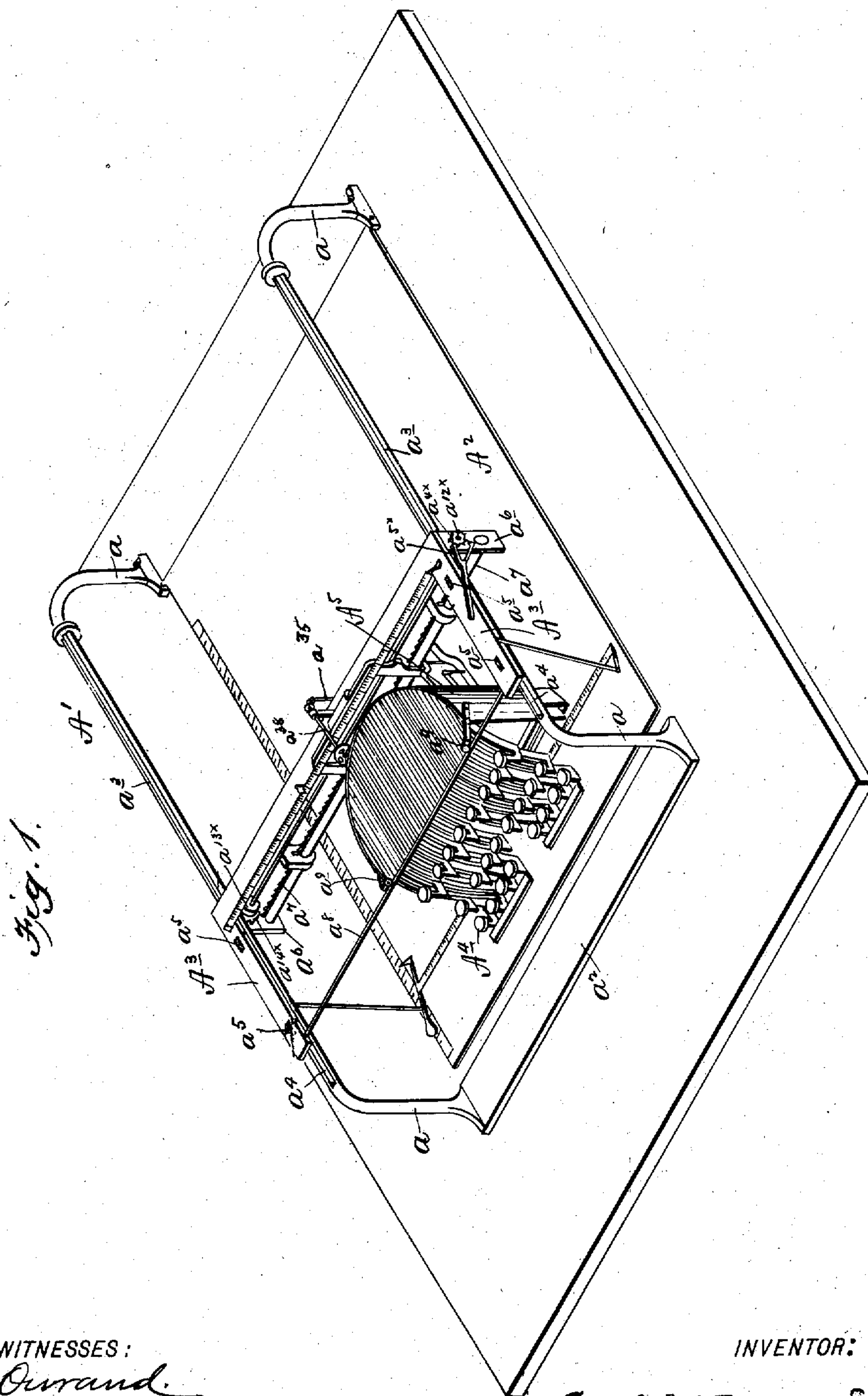


Fig. 1.

WITNESSES:  
F. L. Orrand.  
R. M. Elliott.

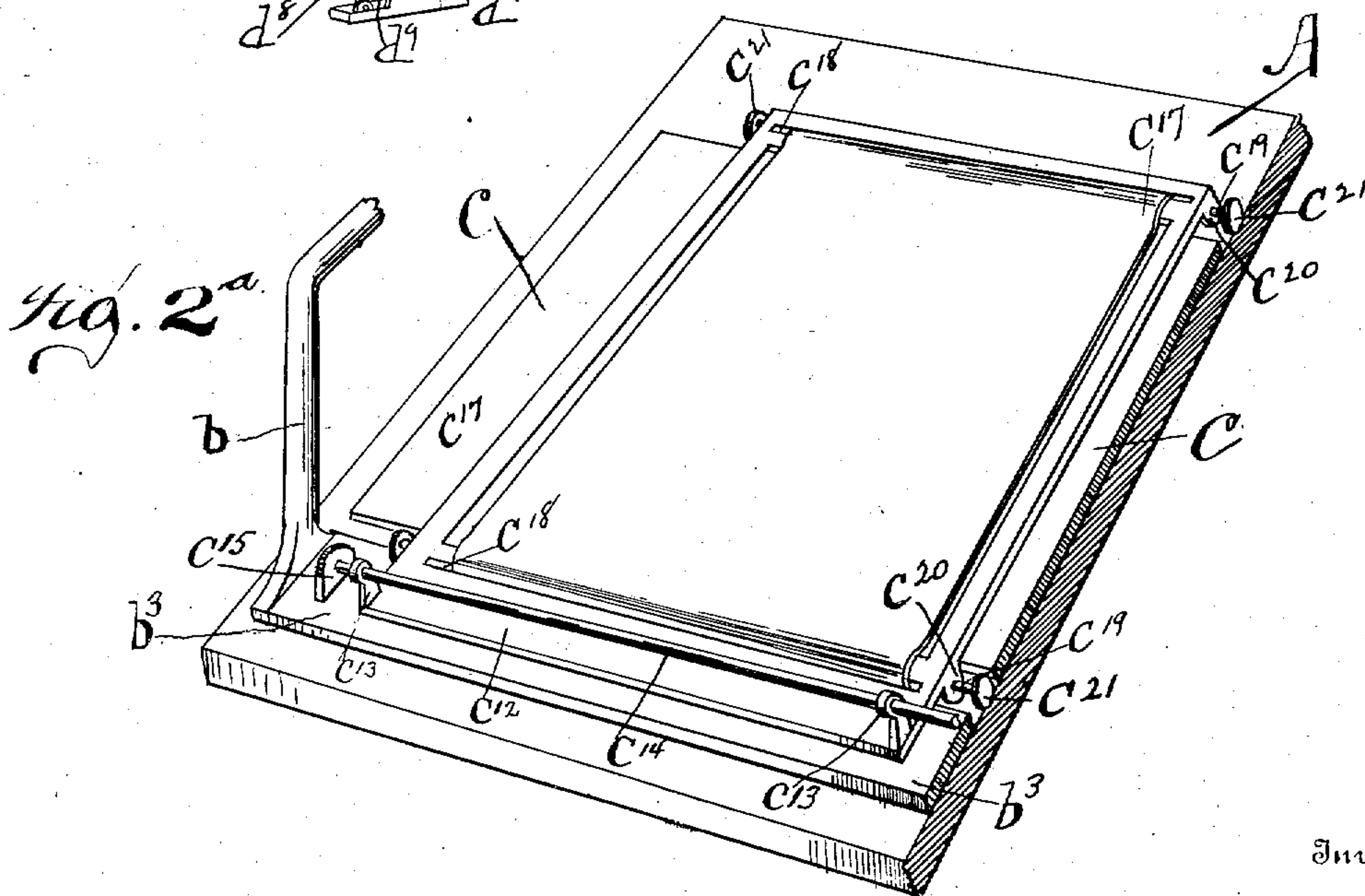
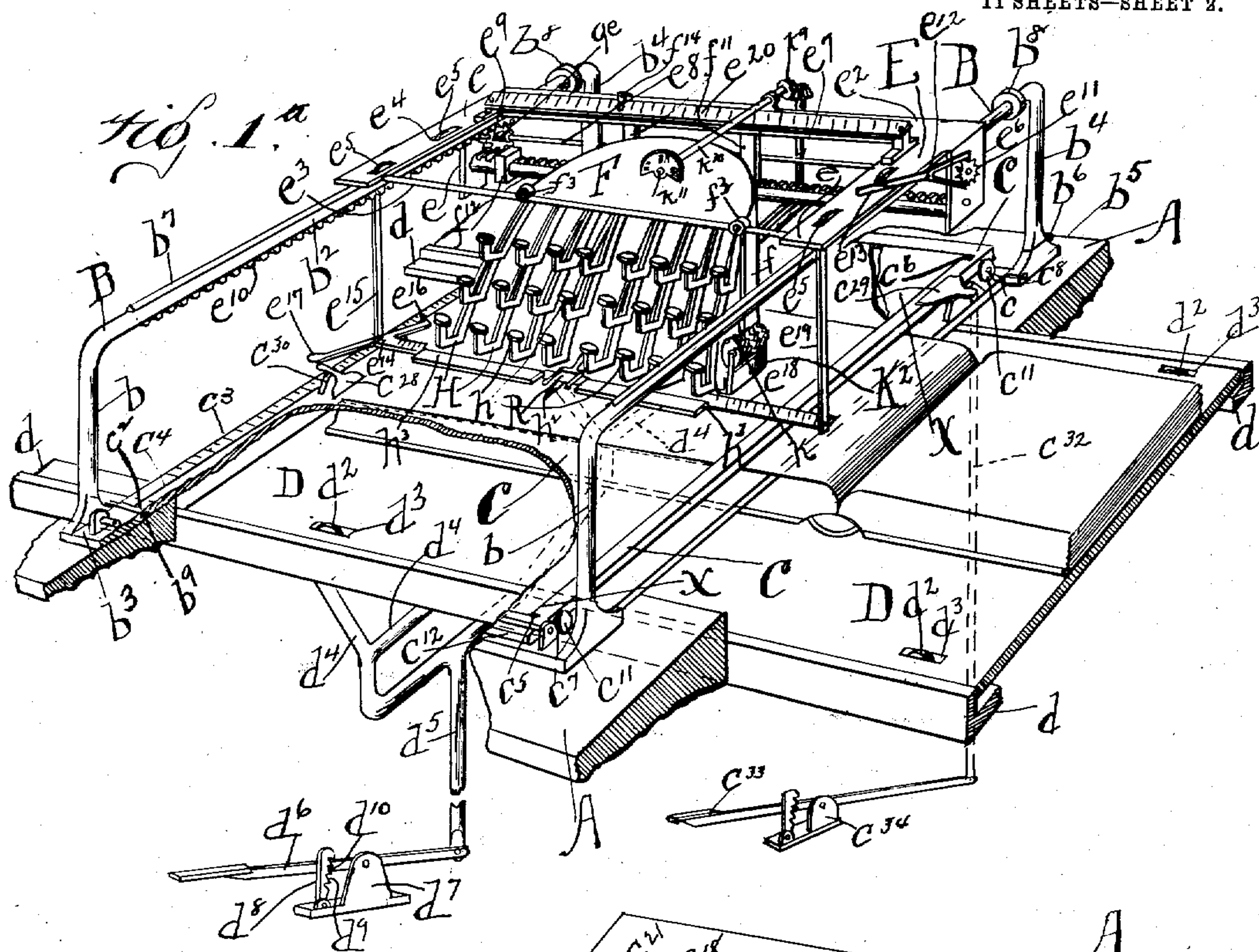
INVENTOR:  
George W. Donning,  
by *A. S. [Signature]*  
his attorney.

BOOK TYPE WRITER.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 2.

970,195.



Inventor

George W. Donning,

by A. S. Dyrenforth,  
his attorney

Witnesses

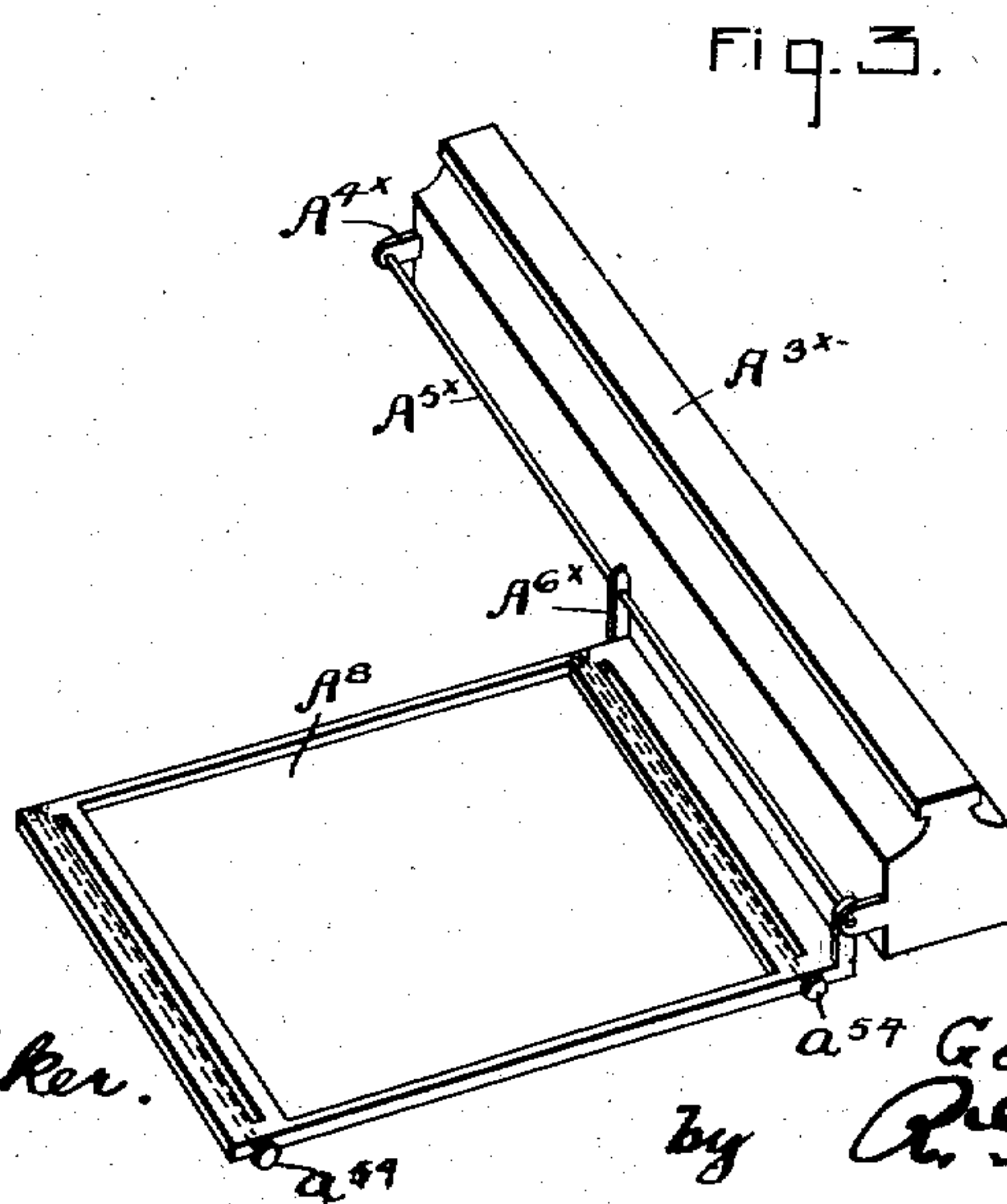
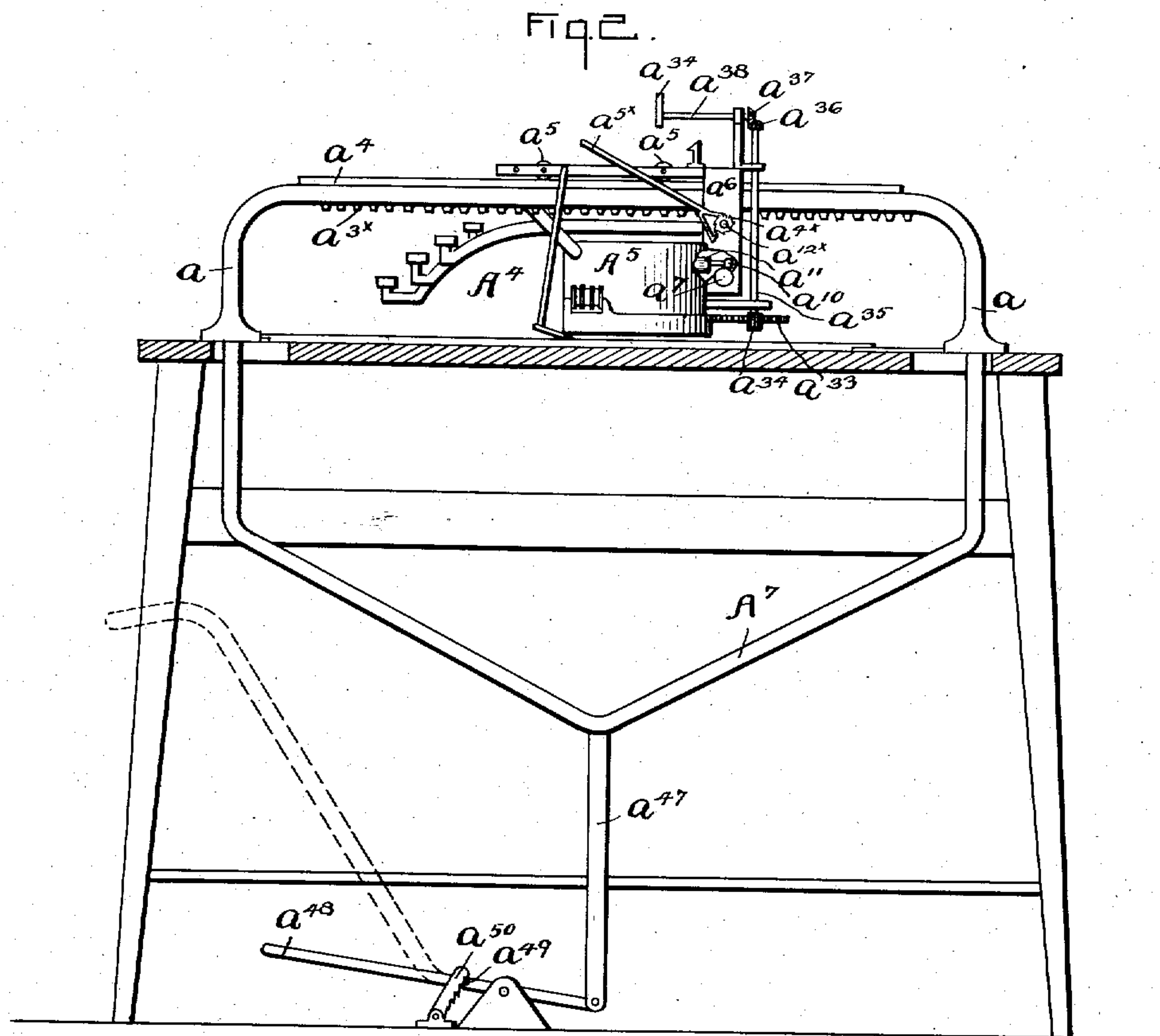
Witnesses  
Philip Sorrell  
C. H. Harry



970,195.

G. W. DONNING.  
BOOK TYPE WRITER.  
APPLICATION FILED JUNE 6, 1899.

Patented Sept. 13, 1910.  
11 SHEETS—SHEET 3.



Witnesses  
H. E. Stonebraker.  
M. B. Faust.

Inventor:  
George W. Donning,  
by *A. S. Dyer*,  
his Attorney.

BOOK TYPE WRITER.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 4.

[illegible]

Inventor

by A. W. S. S. S.  
His Attorney.

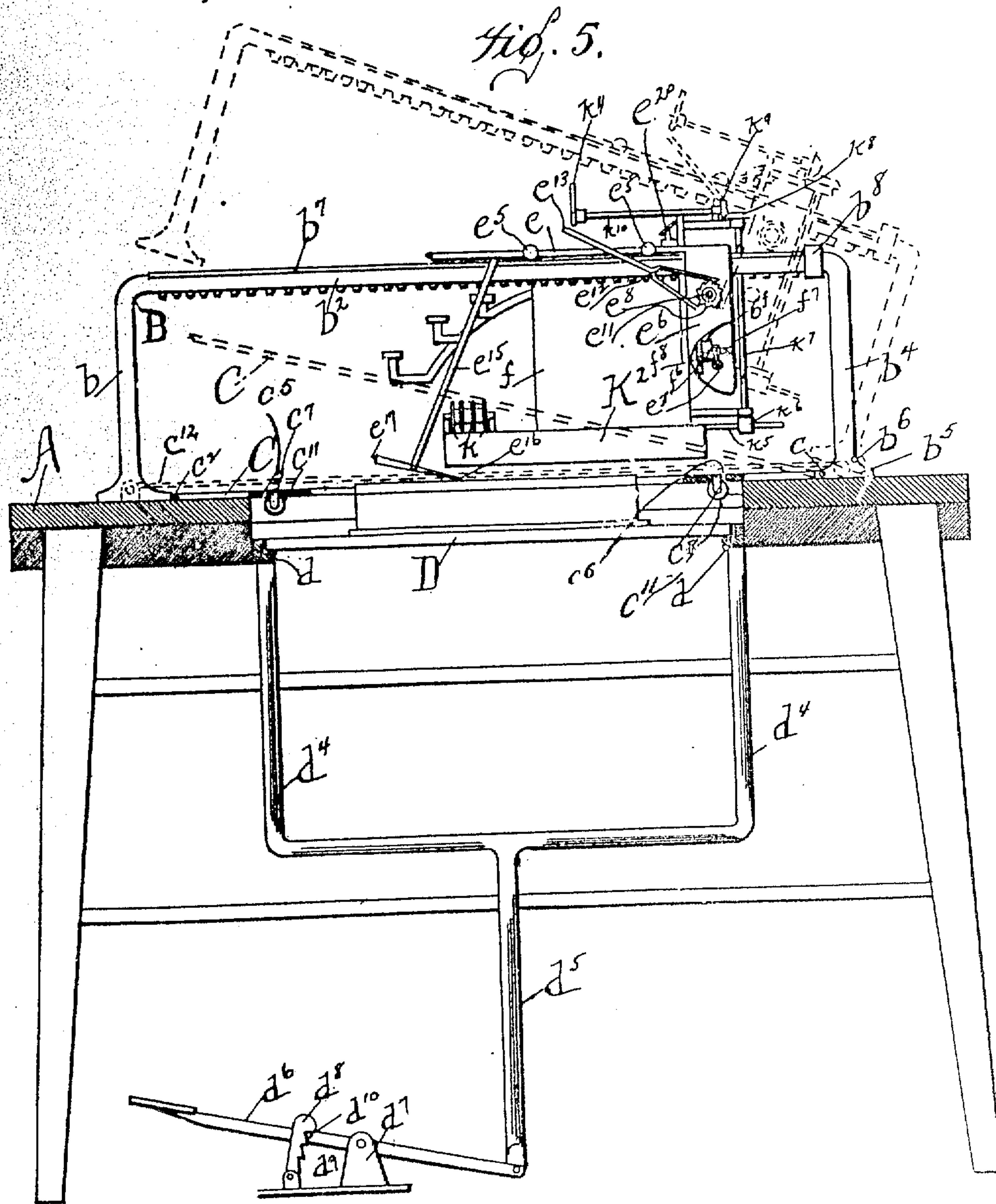
Witnesses

Witnesses  
Philip Cornell  
E. H. Parry

G. W. DONNING.  
BOOK TYPE WRITER.  
APPLICATION FILED JUNE 6, 1899.

Patented Sept. 13, 1910.  
11 SHEETS—SHEET 5.

970,195.



Witnesses  
Philip Sewell  
E. H. Harry

Inventor  
George W. Donning,  
by A. G. Donning,  
Attorney



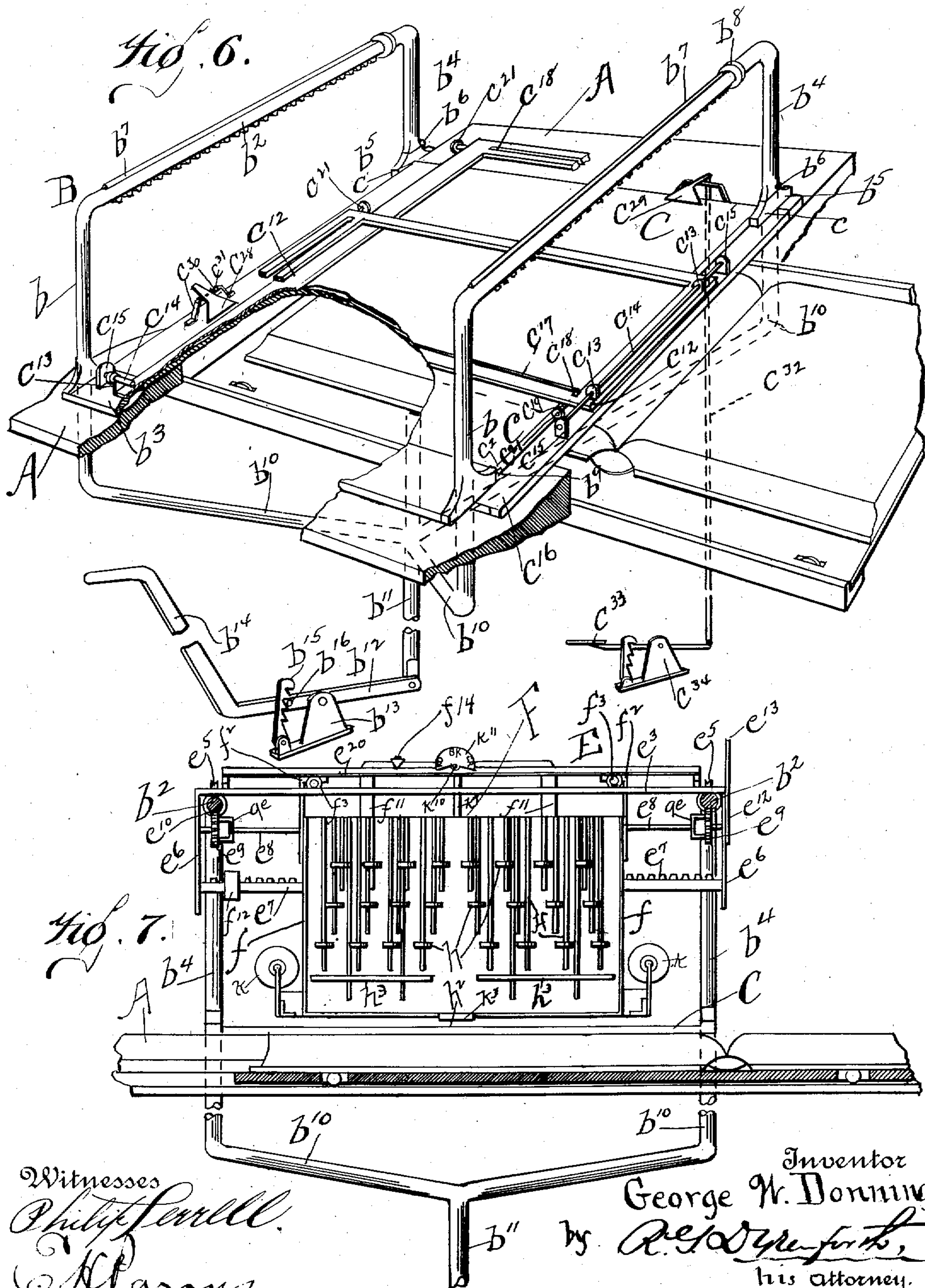
G. W. DONNING.  
BOOK TYPE WRITER.

APPLICATION FILED JUNE 6, 1899.

970,195.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 6.



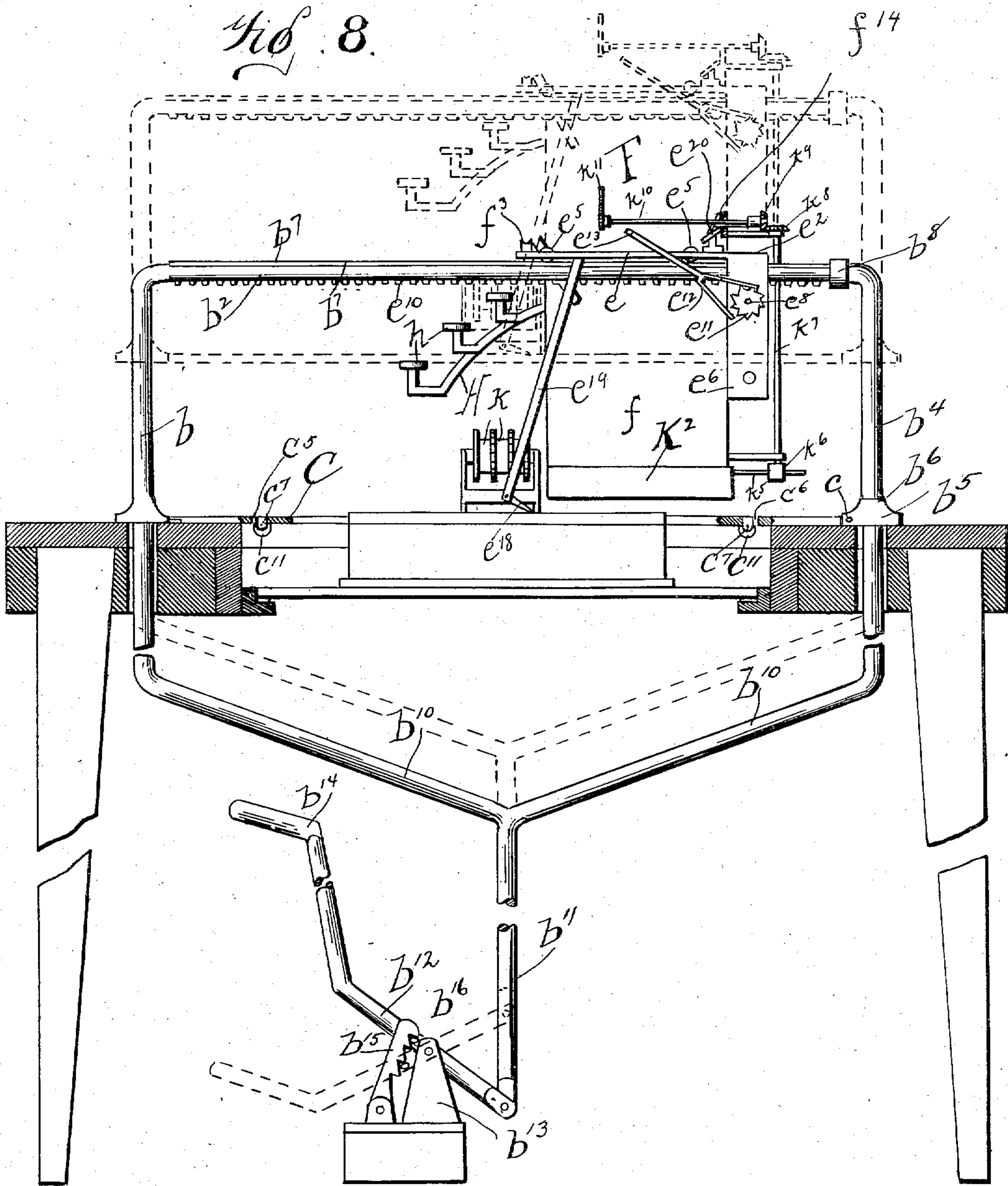
BOOK TYPE WRITER.

APPLICATION FILED JUNE 6, 1899.

970,195.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 7.



Witnesses

Philips Scull.  
E. H. Parry

Inventor:

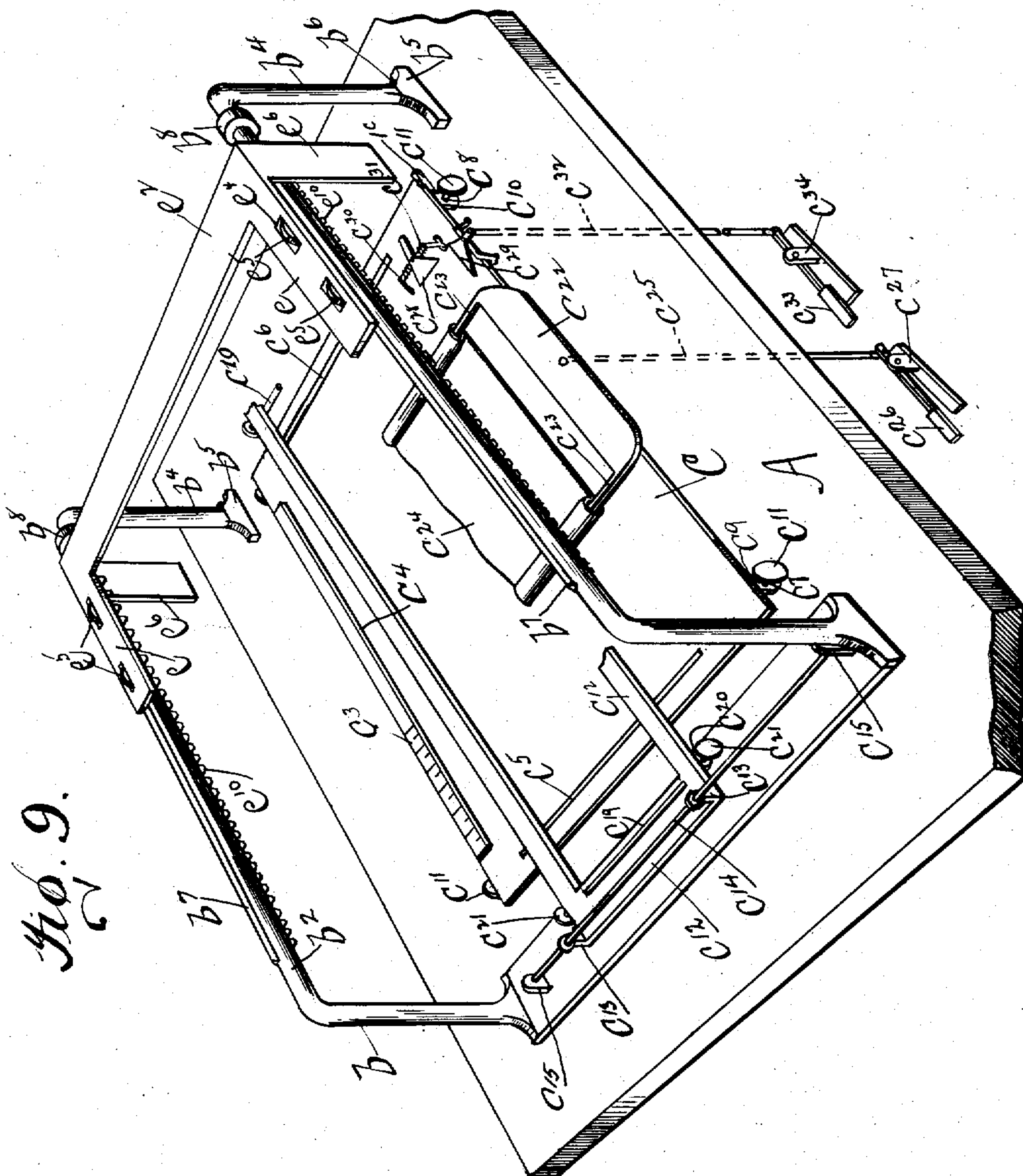
George W. Donning,  
by A. S. Dyrenforth,  
his attorney.



970,195.

G. W. DONNING.  
BOOK TYPE WRITER.  
APPLICATION FILED JUNE 6, 1899.

Patented Sept. 13, 1910.  
11 SHEETS—SHEET 8.



Witnesses  
Philip Serrell.  
C. H. Parry.

Inventor  
George W. Donning  
A. S. Dyckhoff,  
his attorney



970,195.

G. W. DONNING.  
BOOK TYPE WRITER.  
APPLICATION FILED JUNE 6, 1899.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 9.

Fig. 10.

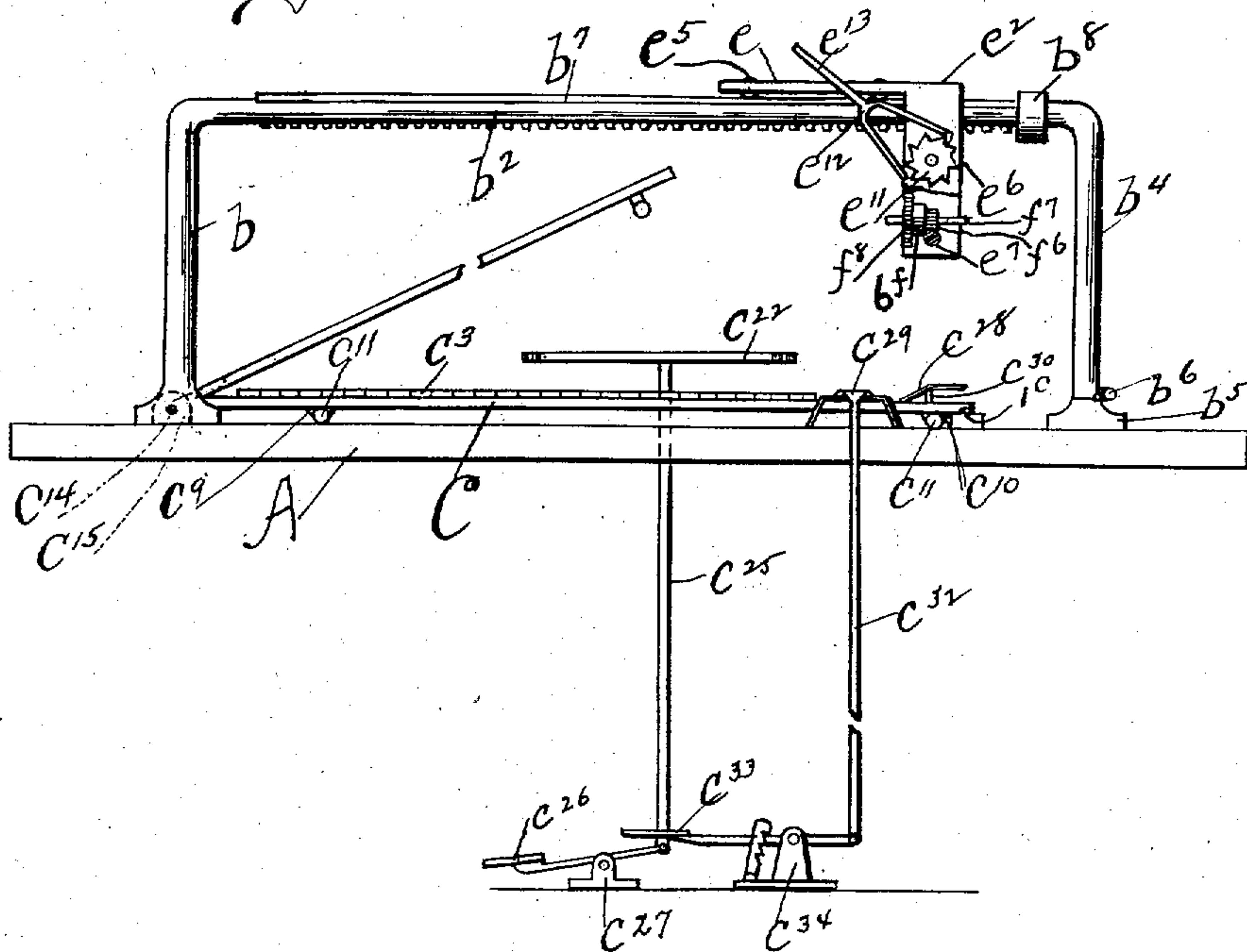
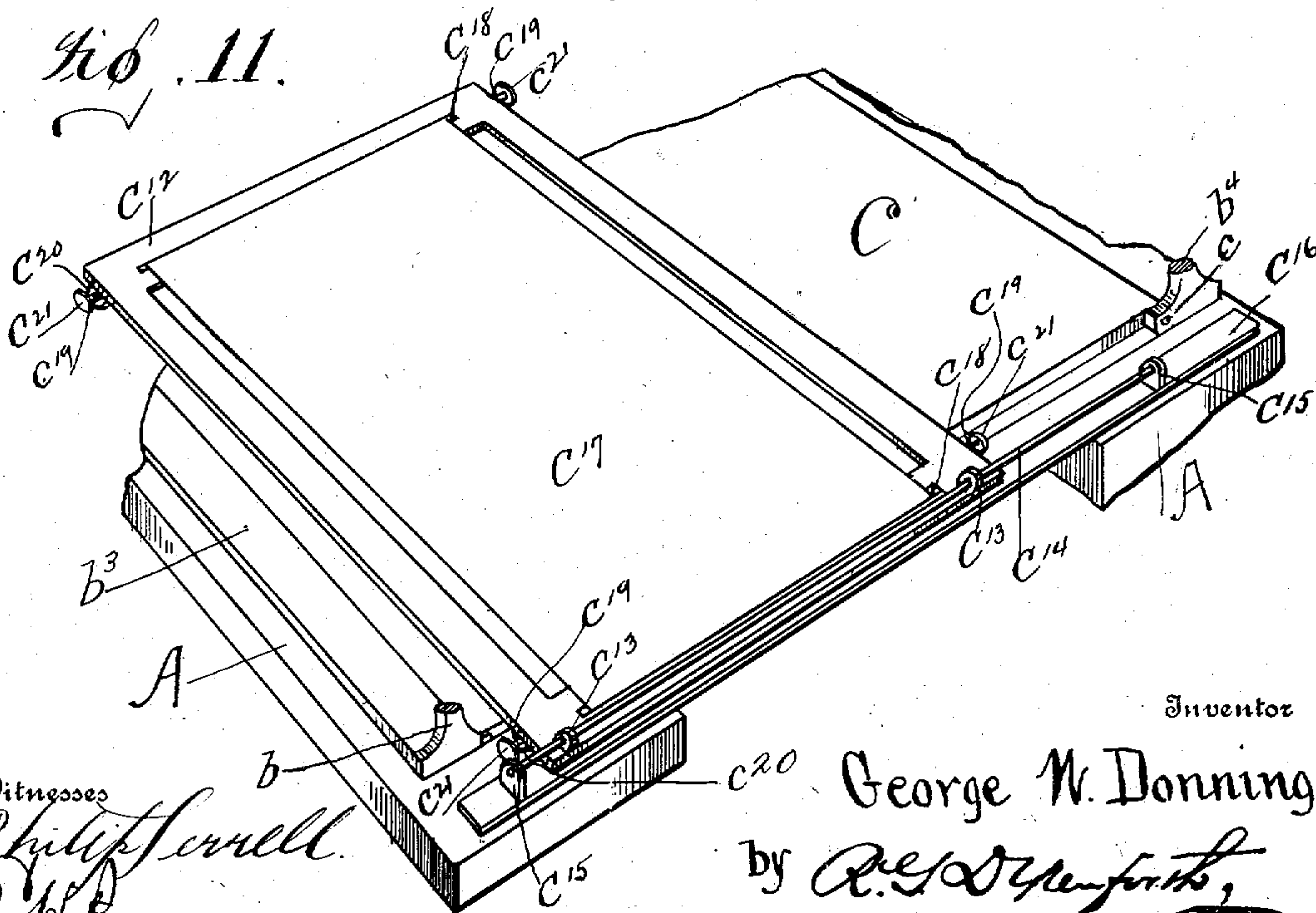


Fig. 11.



Witnesses  
Philip Scrull  
E. H. Parry

Inventor  
George W. Donning,  
by *A. S. Dyer*  
his Attorney.

G. W. DONNING.

BOOK TYPE WRITER.

APPLICATION FILED JUNE 6, 1899.

970,195.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 10.

Fig. 12.

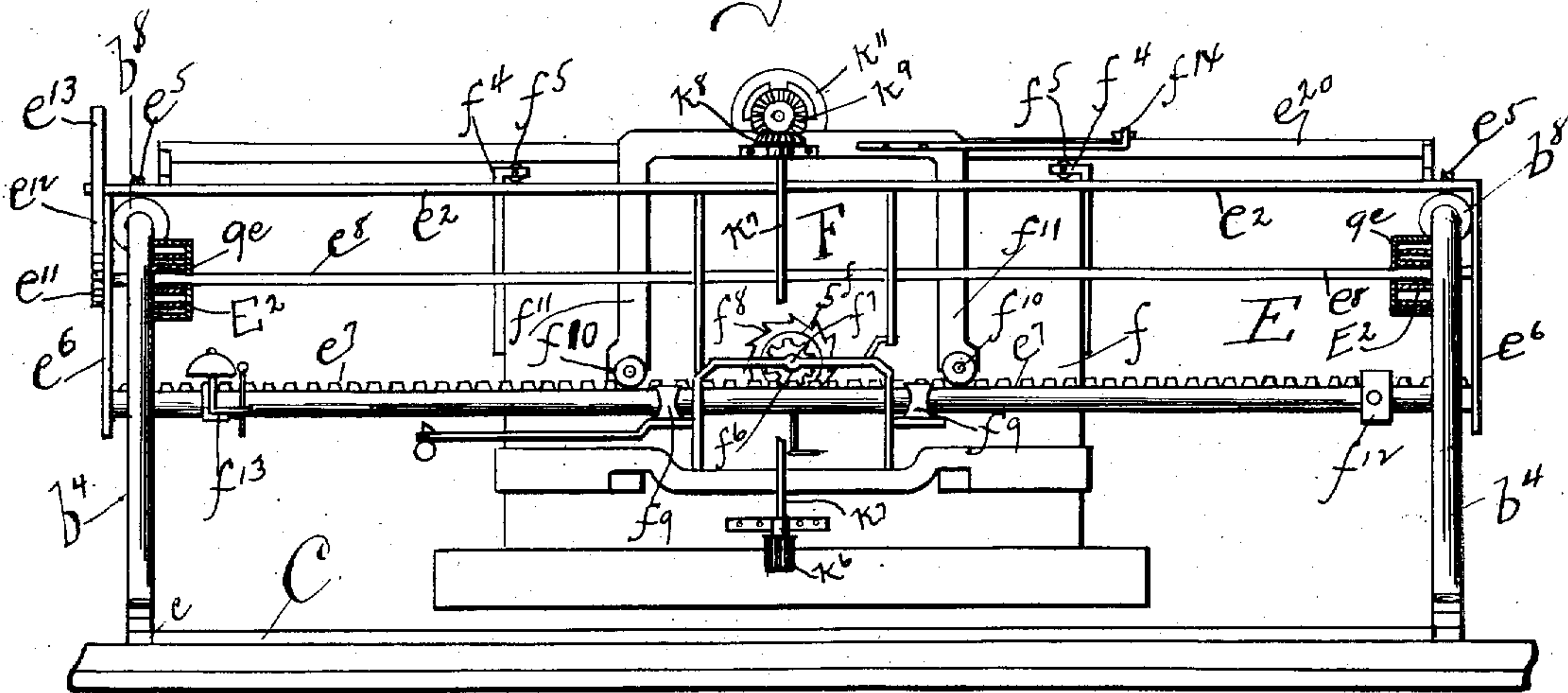
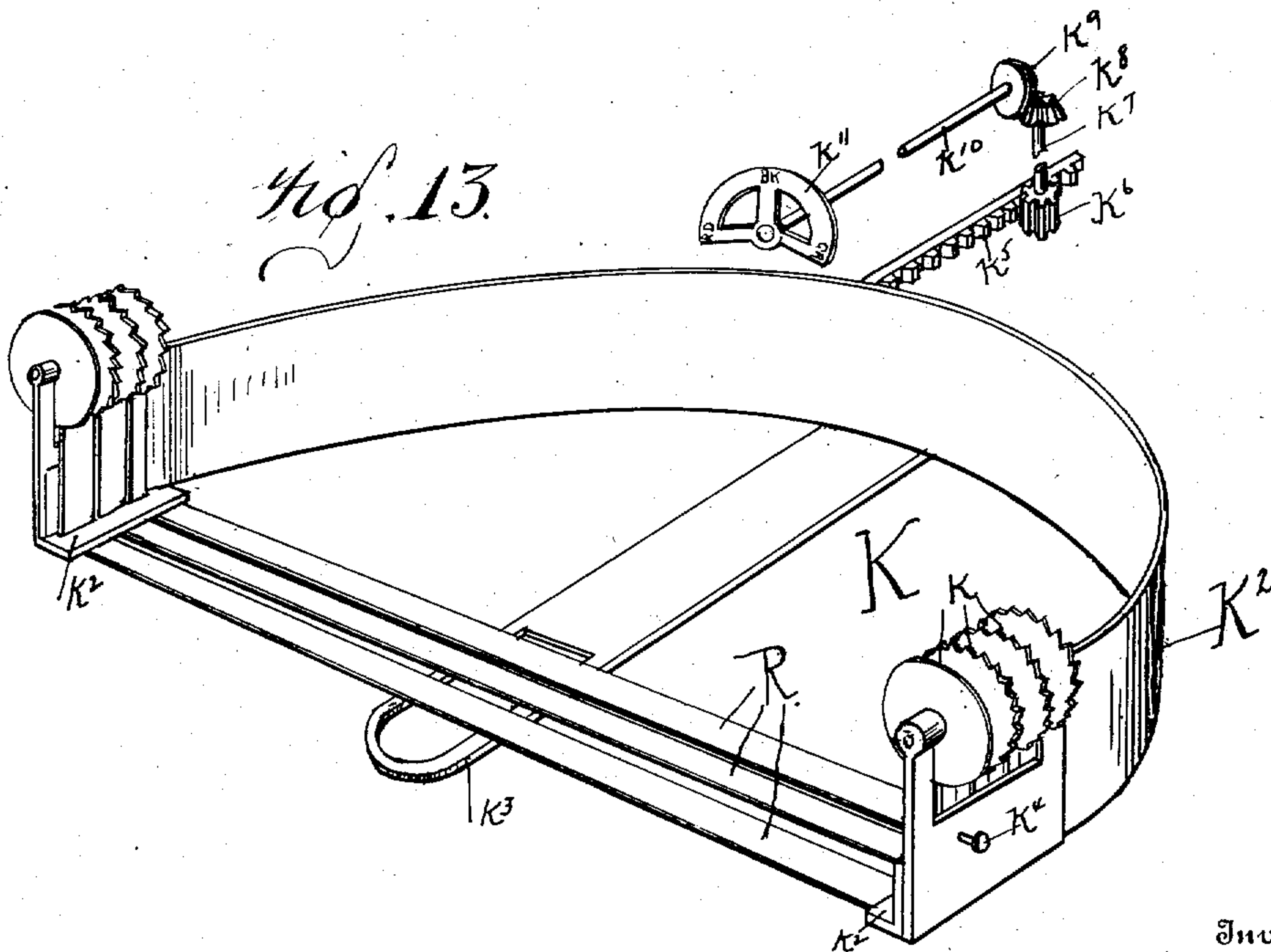


Fig. 13.



Inventor

George W. Donning,  
by *A. S. Dyrenforth,*  
his attorney

Witnesses

*Philip Merrill*  
*E. H. Parry*

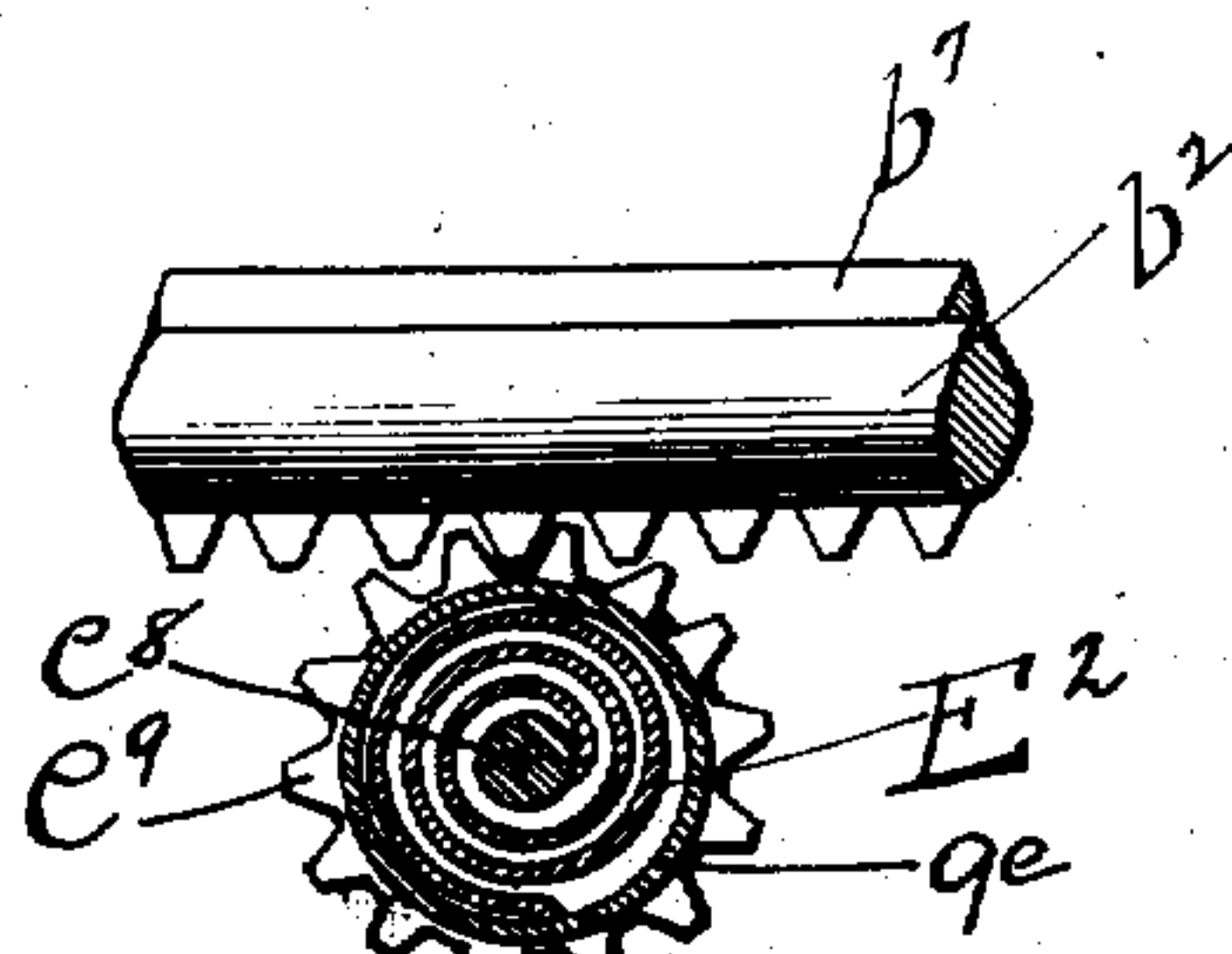
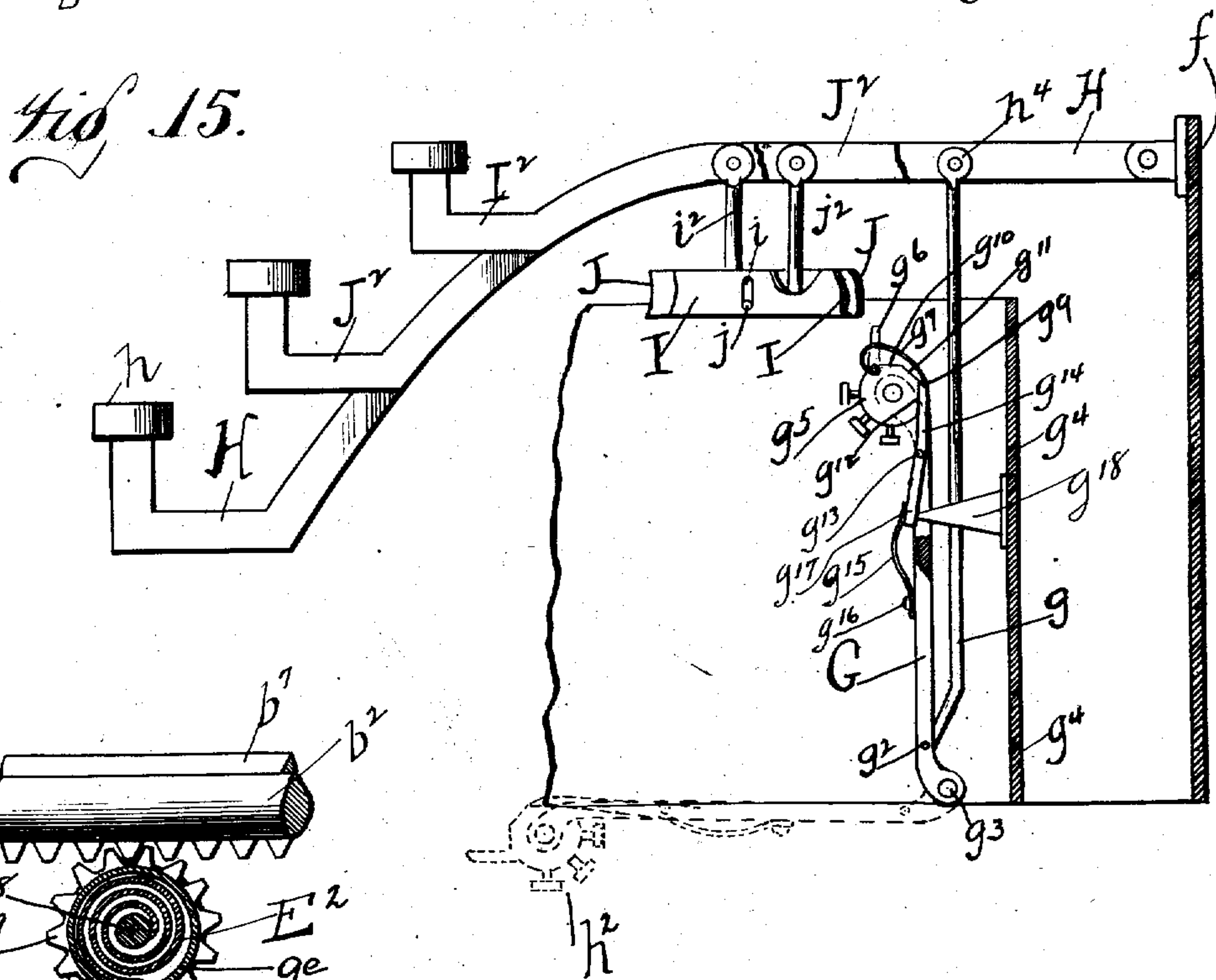
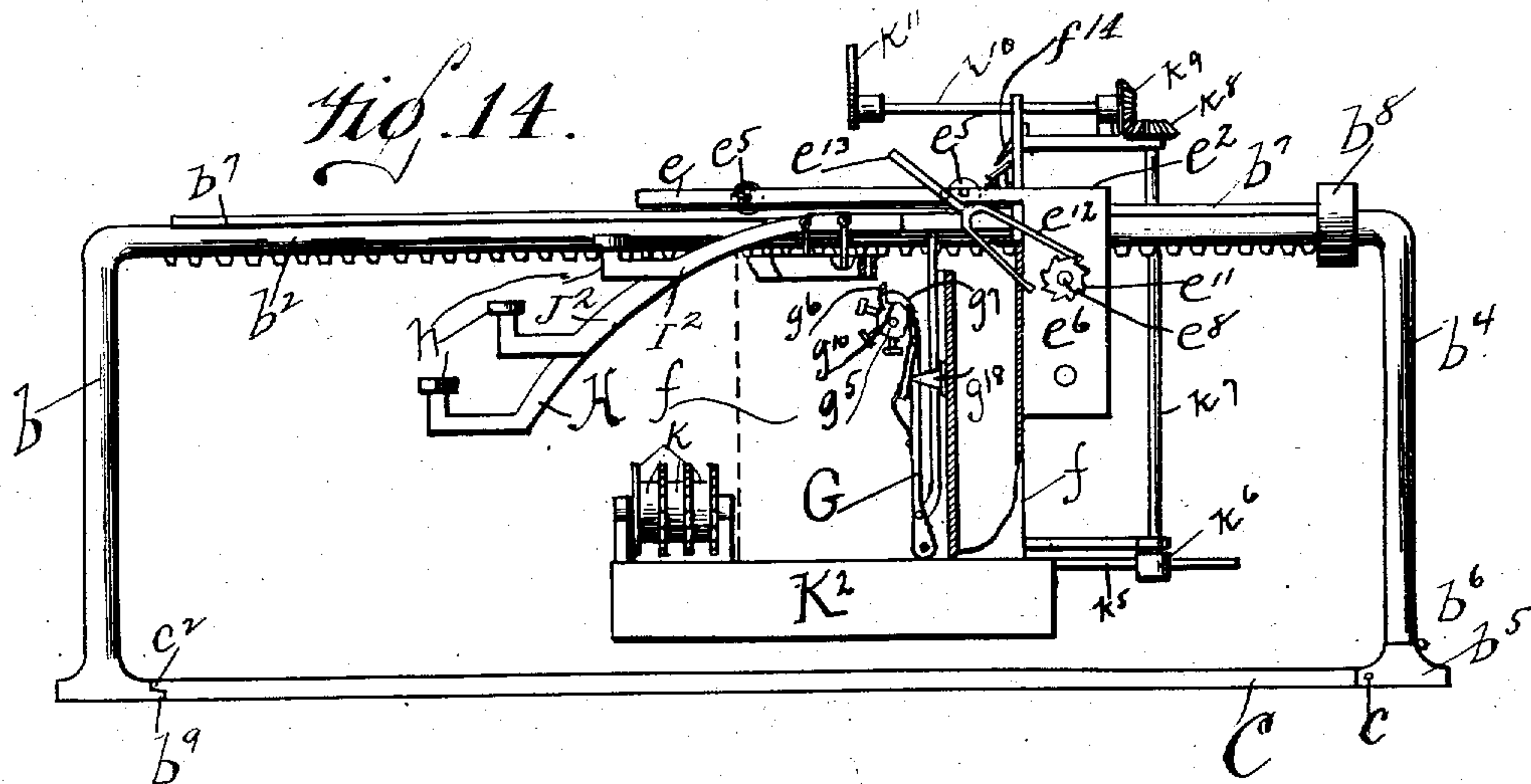


G. W. DONNING.  
BOOK TYPE WRITER.  
APPLICATION FILED JUNE 6, 1899.

970,195.

Patented Sept. 13, 1910.

11 SHEETS—SHEET 11.



Witnesses

*Philip Serrell.*  
*E. H. Lamm.*

Inventor

George W. Donning  
by *A. S. Dyer*  
his Attorney



# UNITED STATES PATENT OFFICE.

GEORGE W. DONNING, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF FIFTY ONE-HUNDREDTHS TO HARRY T. AMBROSE, OF EAST ORANGE, NEW JERSEY.

BOOK TYPE-WRITER.

970,195.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed June 6, 1899. Serial No. 719,623.

*To all whom it may concern:*

Be it known that I, GEORGE W. DONNING, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Book Type-Writers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to present a typewriter (now known in the art as a flat-platen typewriter), in which there are two traveling carriages, both spring-driven to effect their travel, with escape mechanisms for controlling such travel, one traveling in a lateral direction for letter-spacing, (and which herein will be designated the writing-mechanism) and the other traveling in a longitudinal direction for line-spacing, the laterally-traveling carriage being supported on and movable (in the direction of line-spacing) with the longitudinally-traveling carriage, in combination with an underlying flat-platen; the longitudinally-traveling carriage being suspended from tracks or guides and, thus, positioning the writing-mechanism (which is particularly arranged for the purpose, as hereinafter described) in such manner over the platen that a clear and unobstructed field, across the sheet being written upon, is presented, thereby enabling the operator to inspect the work and, also, make any necessary corrections: furthermore, to present, in connection with the suspended writing-mechanism, an underlying, laterally-traveling book-support, with means for positioning one with relation to the other; furthermore, to present carbon-carrying devices arranged for positioning carbon-sheets over the flat platen; furthermore, to present work-holders for confining a sheet of writing-material on the platen; furthermore, to present writing-mechanism comprising a typebar having pivoted at its outer end a type-head carrying a plurality of type-characters, with means for shifting said head to a plurality of positions, means for holding the same in its several shiftable positions, and means for effecting return of the head to normal position after having been shifted therefrom.

With these objects in view, the invention

resides in various novel details of constructions and arrangements of parts, as will hereinafter be more fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like letters of reference indicate corresponding parts, I have illustrated some of the embodiments of my invention; and, in these drawings: Figure 1 is a view in perspective, of one embodiment of my invention, showing the laterally and longitudinally traveling carriages, the tracks from which they are suspended, and flat platen pivoted to the track-frame. Fig. 2 is a view in side elevation, partly in section, of the construction shown in Fig. 1, and showing in detail, the mechanism for raising and lowering the track-frame, and machine. Fig. 3 is a detail view in perspective, of the carbon-carrying skeleton frame, attached to the track rail of the usual form of book-type-writing machine. Fig. 1<sup>a</sup> is a view in perspective of a slightly modified embodiment of my invention, showing the laterally and longitudinally-traveling carriages, the tracks from which they are suspended, the flat platen, a carbon-carrying frame projecting over the platen, and the underlying, laterally-traveling platform or book-support, with the device for elevating the same toward and away from the writing-mechanism; Fig. 2<sup>a</sup> is a detached, detail view of the said carbon-carrying frame overlying the platen; Fig. 3<sup>a</sup> is a similar view of another carbon-carrying frame not shown in Fig. 1<sup>a</sup>; Fig. 4 is a view, in front elevation, of the form of machine illustrated in Fig. 1<sup>a</sup>; Fig. 5 is a view, in side elevation, thereof; Fig. 6 is a view, in perspective, of a modified form wherein the writing-mechanism is capable of being elevated relative to the laterally-traveling book-rest which, in this instance, has no movement in a vertical direction; Fig. 7 is a view in front elevation thereof; Fig. 8 is a view in side elevation thereof; Fig. 9 is a view, in perspective, of another modification, wherein the book-support is omitted; Fig. 10 is a view in side elevation thereof; Fig. 11 is a view in perspective of the carbon-carrying-frame shown in Fig. 1<sup>a</sup>, and again in Fig. 9, disposed at the side of the platen, in lieu of at the front, as in said other figure; Fig. 12 is a view in rear ele-



vation, showing, more particularly, the writing-mechanism-carriage; Fig. 13 is a detail view of the ribbon-mechanism thereof; Fig. 14 is a view in side elevation of the writing-mechanism, parts being omitted or broken away more clearly to show the form and disposition of the typebars and their operating-devices; Fig. 15 is a detached, detail view of a typebar, showing more graphically its movable head and the devices for effecting its shifting, retention, and return to normal position; and Fig. 16 is a similar view of the mechanism for effecting travel of the line-spacing carriage.

Referring to these drawings; and referring, now, to the form of device of Figs. 1 to 3:  $A'$  designates the frame for supporting the writing mechanism, said frame including the standards  $a$ , connected at the front by the transverse plate  $a^2$ , and upon the standards are supported the ways or tracks  $a^3$ , on which the writing mechanism travels. As shown in Fig. 1, the rear standards are constructed of two parts, hinged together, the platen being pivotally connected to the fixed portion of the standards, so as to permit lifting or tilting of the tracks, relative to the platen, and the tracks and platen are further adapted to be moved together by the mechanism shown in Fig. 2. The tracks  $a^3$  are each provided with a rib  $a^4$ , adapted to be engaged by the sheaves or rollers  $a^5$ , which are mounted in the frame  $A^3$ , carrying the typewriting mechanism. The frame  $A^3$ , shown in Fig. 1, is preferably rectangular in form, and provided at its rear with two depending arms  $a^6$ , in which is mounted the rack-carrying bar  $a^7$ , upon which the rear portion of the machine is supported. The front part of the machine is supported by the bar  $a^8$ , carried by the frame  $A^3$ , and sheaves  $a^9$  carried by the typewriting mechanism, engage said rod and thereby facilitate the lateral movement of the machine. The mechanism by which the step-by-step lateral movement is imparted to the carriage, may be of any preferred character, and in the present instance, comprises a spring-operated gear-wheel  $a^{10}$ , the teeth of which mesh with rack-teeth arranged on the upper side of the bar  $a^7$ . An ordinary spiral spring housed in a barrel  $a^{11}$ , serves to impart movement to the gear  $a^{10}$ , the operation of the parts being the same as in similar machines of the usual construction. An adjustable stop, for regulating the length of a line, an alarm-bell, and escapement dog are provided and operate as in machines of ordinary form. In order to impart intermittent, step-by-step, forward movement to the carriage, for line-spacing, I provide a shaft  $a^{12x}$  the ends of which are journaled in the arms  $a^6$  of the frame  $A^3$ , as appearing in Figs. 1 and 2. The shaft  $a^{12x}$  carries two barrels  $a^{13x}$  in which are

housed ordinary spiral springs, the ends of the shaft, adjacent to the barrels  $a^{13x}$  having secured thereto gears  $a^{14x}$ , arranged to mesh with teeth  $a^{3x}$  on the under side of the tracks  $a^3$ . At one end of the shaft  $a^{12x}$  is attached a ratchet-wheel  $a^{4x}$  which is engaged and controlled by a double-toothed pawl  $a^{5x}$ , carried by a lever pivotally secured to the frame  $A^3$ . By alternately raising and lowering the lever, the pawls will release the ratchet-wheel, and permit the carriage to move forward, step-by-step, for each line. After the carriage reaches the limit of its forward movement, the same is repositioned by being pushed to the rear, which movement places the springs in barrels  $a^{13x}$  under tension, sufficient to move the carriage, as described.  $A^4$  designates the successive banks of key-levers in gradually increasing lengths and curves, as shown, in order that the writing may be seen readily from the front of the machine, and that the carriage may be as close to the platen as practicable. The ribbon-shifting mechanism, by which two or more colored ribbons may be used, includes a frame for carrying the ribbon spools, and to which is secured a rack-bar  $a^{33}$ . A pinion  $a^{34}$  is mounted on a shaft  $a^{35}$ , for engagement with the aforementioned rack. The shaft  $a^{35}$  is provided, at its upper end, with a pinion  $a^{36}$ , which is engaged by a similar pinion  $a^{37}$ , mounted at one end of the shaft  $a^{38}$ , which carries, at its other end, an indicator,  $a^{39}$ , comprising a semi-circular disk bearing on its face the means, or indications, of the different ribbons employed. To afford means for readily elevating the machine as a whole, I provide a frame  $A^7$ , connected with the standards  $a$ , as shown in Fig. 2. The frame  $A^7$  is of suitable form, for convenience and appearance, and carries a downward-projecting extension  $a^{47}$ , to the lower end of which is connected a lever  $a^{48}$ . The lever  $a^{48}$  is provided with a pin or projection  $a^{49}$ , adapted to engage with a pivoted rack  $a^{50}$ , to hold the machine at the desired elevation. In Fig. 3, I have shown a means for obtaining manifold copies of a sheet written upon, the same including a carbon-carrying skeleton frame pivotally attached to some portion of the track-frame. In this instance,  $A^{3x}$  designates a portion of the frame, of that type of machine in which the tracks rest directly on the platen. Secured to the frame  $A^{3x}$  are lugs  $A^{4x}$ , in which is mounted the rod  $A^{5x}$ .  $A^8$  is the skeleton frame, mounted on the rod  $A^{5x}$  by means of the lugs  $A^{6x}$ . The frame  $A^8$  may be constructed of wire, or any other desirable material, to which is secured the manifolding sheet, either carbon paper, or other fabric having a suitable ink applied thereto. The manifolding sheet may be attached to the frame in any desired manner, as, for instance, by winding the same upon the rods



$c^{54}$ , carried thereby. It is to be understood that the carbon-carrying frame may be attached to any portion of the track-frame, as for instance, at the front thereof, when the elevated tracks are employed, as will be more fully described hereinafter.

Reference is to be had, now, to Figs. 1<sup>a</sup>, 2<sup>a</sup>, 3<sup>a</sup>, and 4 to 8 inclusive, showing a somewhat modified embodiment of my invention, and, in which A designates the table upon which the machine is supported. B designates the two carriage-supporting tracks or guides, each of which, in this instance, comprises, preferably, a front and a rear standard  $b$  and a connecting-portion  $b^2$ . Between the two front standards, (as shown in Figs. 1<sup>a</sup>, 2<sup>a</sup>, 6, 9, and 11) extends a cross-bar  $b^3$  which normally rests upon the top of the table A. The rear standards preferably comprise a vertical portion  $b^4$  and a hinge-member  $b^5$ ; the member  $b^5$  being secured to the table top A, and being connected to the vertical portion  $b^4$  by a hinge  $b^6$ , and by this arrangement the rails are rendered tiltable. By constituting the rails on the standards, said rails are normally above and independent of the parts below. Upon the top of the connecting-portion  $b^2$  of said rail is a spline or rib  $b^7$ ; and at the rear portion are carriage-abutments  $b^8$ . Overlying the table-top A is a platen C, which at its rear is pivoted at  $c$  to the hinge-member  $b^5$  to permit of its being tilted when the tracks are tilted, or independently thereof; and, at its front, rests on a ledge or flange  $b^9$  formed on the cross-bar  $b^3$ , the platen being cut away on its front end at  $c^2$  to engage said ledge or flange  $b^9$ . The tilting of the platen and the rails may be accomplished by this arrangement, simultaneously; that is to say, when the rails are elevated, the platen which rests thereon at its front end, as described, will be raised therewith. The tilting of the platen, however, may, of course, be accomplished independent of, and without tilting the rails. The rails are supported over the platen and to one side thereof and do not rest thereon. The object of utilizing this arrangement of track-rails, to wit, rails which occupy a plane considerably above the platen, is to provide for a free field of operation at, and contiguous to, the edge of the platen, as distinguished from a construction wherein the track-rails rest on the surface of the platen, in which arrangement the tracks are in the way of easy and proper positioning of a page of an underlying book over and away from the platen; furthermore, to provide against the danger of contacting with, or smearing of, the page by the traveling writing-mechanism, hereinafter more fully discussed, which, by being suspended from the tracks is sufficiently removed from the page to obviate any such danger. Upon the left-

hand edge of the platen C is a longitudinal graduated scale  $c^5$  constituting a line-indicator, the edge of which scale constitutes a gage-abutment  $c^4$ . As shown in Figs. 1<sup>a</sup>, 5 and 8, the platen is provided near its front and rear edges with transverse slots  $c^5$ ,  $c^6$ , and contiguous to these slots are spindles, supported, respectively, on bracket  $c^7$ ,  $c^8$ , the spindles being provided on their ends, to one side of said brackets, with knurled heads  $c^{11}$  for rotating the spindles which are designed to carry a web X, Fig. 1<sup>a</sup>, to be fed through said slots and across the platen, such feeding being effected by turning the spindles in the proper direction. Hinged or otherwise pivoted over the platen is a carbon-carrying member  $c^{12}$ ; in this instance, a frame carrying at its pivotal end two eyes or lugs  $c^{13}$ ,  $c^{13}$ , through holes in which extends a supporting-bail  $c^{14}$  arranged in posts  $c^{15}$ ,  $c^{15}$ , secured either to a suitable bar or rail, such as to the cross-bar  $b^3$ , as shown in Figs. 1, 2<sup>a</sup>, 7, 8, 9, and 10, or to a bar or rail  $c^{16}$  extending longitudinally of the platen, as in Figs. 1, 6 and 11. This member  $c^{12}$  is designed normally to overlie the platen as shown; but, when it is desired to raise the platen, or in order to elevate the carbon-web  $c^{17}$  which it carries, it is tiltable on its pivot. The front and rear sides of the frame, being of a sufficient width for the purpose, are provided with transverse slots  $c^{18}$ ,  $c^{18}$ , through which the carbon-web is passed from the carbon-carrying spindles  $c^{19}$ ,  $c^{19}$  supported in brackets  $c^{20}$ ,  $c^{20}$  secured to the lower face of said frame, said spindles being rotated by means of the knurled heads  $c^{21}$ ,  $c^{21}$ . By this arrangement, the carbon-web can be moved to bring a new or fresh portion into position. As said, this carbon-carrying member  $c^{12}$  is designed to overlie the platen, and is made tiltable, also, so that it may be elevated away from the platen to permit a sheet of paper to be placed thereunder. By being arranged on the bail, shifting of the member over the top of the platen is permitted so that it can be positioned at any desired point, and tiltable at any time and position. In practice, the carbon-carrying spindles would be so arranged that they would be, each, below the plane of the face of the platen, as, for instance, to one side of an edge of the platen, in order that the frame itself might be permitted to lie flatly upon the upper surface of the platen, and constitute a work-confining device. It is operable independent of the platen or the track-rails.

In lieu of this form of carbon-carrying device and work-holder, or in conjunction therewith, I may employ the form illustrated in Figs. 3<sup>a</sup> and 9, and 10, which is a three-sided member comprising a body-portion  $c^{22}$ , with two extending arms,  $c^{23}$ ,  $c^{23}$ , on which may be secured a sheet of carbon  $c^{24}$ .



This member is likewise designed normally to rest upon the platen and constitute a work-confining device, its weight being sufficient to make it subserve such a result. Depending from its said body-portion  $c^{22}$ , and extending through the table-top is a rod  $c^{25}$  operated by foot-treadle  $c^{26}$  pivoted in a standard  $c^{27}$  secured, in this instance, to the floor. By pressing with the foot on said treadle, the rod  $c^{25}$  is raised, which raises the three-sided member up and away from the platen (as shown in Fig. 10) in order that a work-sheet, such as a folded statement blank or billing form, be quickly and readily inserted thereunder; so that one portion of said billing-form will overlie the carbon-web and the under portion underlie the same, and when elevated, separates the carbon from the paper. As additional means of confining the work-sheet on the platen, I may employ the spring-clamps  $c^{28}$ ,  $c^{29}$ , which may be disposed in a preferred position to operate upon the platen, as in Fig. 1<sup>a</sup>, or as in Fig. 9. The clamp  $c^{28}$  is supported on the bridge  $c^{30}$  which carries a spring  $c^{31}$ . This clamp is operated by hand. The clamp  $c^{29}$  differs from  $c^{28}$  in that it is operated, through the depending rod  $c^{32}$  (which penetrates the table-top) by the foot-treadle  $c^{33}$  pivoted on the standard  $c^{34}$ .

Referring to Figs. 1<sup>a</sup>, 4, 5, 6, 7, and 8: Underlying the platen is a one-leaf sliding platform, or book-support or leaf D sustained on two transverse incut guides or angulated ways  $d$ ,  $d$ , ease of manipulation of the support or leaf in its travel on said guides being facilitated by the employment of sheaves or rollers  $d^2$ ,  $d^2$ , disposed in slots  $d^3$ ,  $d^3$ , in the leaf and running on the angulated portion of the guides. As shown in Figs. 1<sup>a</sup>, 4 and 5, there is provided an arrangement wherein the book-support is capable of being elevated and depressed relative to the underside of the platen, which, in this embodiment, is relatively stationary; whereas, in Figs. 6, 7 and 8, there is an arrangement wherein the platen and track-rails are movable vertically and the book-support is relatively stationary,—as will now be more fully described.

Referring now to the embodiment of Figs. 1<sup>a</sup>, 4 and 5: The elevating-mechanism of said book-support comprises a frame composed of radiating-arms  $d^4$ ,  $d^4$ , which connect with said leaf-supporting guides  $d$ ,  $d$ , and a downward-projecting extension  $d^5$ , with which connects, at its lower end, one end of a foot-treadle piece  $d^6$ , fulcrumed on a standard  $d^7$ , and contiguous to which is a pawl  $d^8$ , pivoted at its lower end to said standard and provided with teeth  $d^9$  designed to engage a pin  $d^{10}$  on the treadle-piece  $d^6$ . The treadle, with the extension  $d^5$  and the radiating arms  $d^4$  engaging the leaf-

supports, constitutes a means whereby the book-support may be raised to or lowered from the platen, as desired, to position the book, according to its thickness, relative to the platen. It is to be understood that one side of the book lies on the leaf D, underneath the platen, and one of its pages is folded over the upper surface of the same, as shown in Fig. 1<sup>a</sup>. As the page is changed and the book becomes thicker on the one side, it becomes necessary to depress the book-support to allow therefor, and the support-positioning device, just described, is brought into use. When the desired position of the parts is secured, a tooth on the pawl engages the pin  $d^{10}$ , and holds, that is, locks, the parts in proper position. When a page on the opposite side of the book is to be written on, the book-support is pushed over to carry the book to the other side of the platen. In lieu of this arrangement, I may elect to construct the book-support without means for elevating it, so that it shall have no movement in a vertical direction (though, of course, it would be capable of lateral travel, as already described, to facilitate positioning of the book to one or the other side of the platen); and provide for elevating the platen and rails vertically, whereby handling of the book is permitted and the increasing or decreasing thickness of the book allowed for. To this end, therefore, I utilize the same form of lifting-device for raising the tracks and platen as has just been described for positioning the book-support vertically, and comprising radiating arms  $b^{10}$  projecting through the table-top and connecting with the standards  $b$ , and running into a downward-projecting extension  $b^{11}$ , which, at its lower end, is pivoted to a rocking-lever  $b^{12}$ , pivoted on a standard  $b^{13}$ , and extending downward to a hand-piece  $b^{14}$ , to be operated by hand, in which particular it differs from the book-support-lifting-device, though it is to be understood that I may employ the foot or the hand-lever in either case. To hold and lock the lever  $b^{12}$  in position, a pawl  $b^{15}$ , pivoted on the standard  $b^{13}$ , is disposed to engage a pin  $b^{16}$  in the manner already described. By reason of the platen being hinged to the rail-standards at the rear, and resting on the cross-bar at the front, the platen will be raised with the rails. By the lifting-mechanisms, already described, I am enabled to raise either the book-support, or the rails and platen to predetermined heights relative one with the other, and there is thus provided means for elevating the book-support, or the tracks and platen, as the case may be, one relative to the other, combined with means for locking the same in any desired position, combined with a laterally-traveling book-support.

Designed to travel on the elevated tracks



B is a line-spacing-carriage E comprising a rectangular frame composed of two side members  $e$ ,  $e$ , a rear cross-bar  $e^2$ , and a front cross-bar  $e^3$ . In the side-members are slots  $e^4$ ,  $e^4$ , in which are journaled V-shaped sheaves, rollers or wheels  $e^5$ ,  $e^5$ , designed to traverse the ribs  $b^7$  on the rails. Depending from the side-members at the rear ends thereof, are plates  $e^6$ ,  $e^6$ , between which extends, at the rear, a rack or feed-bar  $e^7$ , and, also, a transverse shaft  $e^8$ , which is journaled in said plates and on each end of which, contiguous to, and on the inside of, said plates  $e^6$ , is a toothed wheel  $e^9$  designed to engage a rack  $e^{10}$  on the underside of each rail B (Figs. 1<sup>a</sup> and 16). The shaft  $e^8$  carries also, at or near its ends, contiguous to the gears  $e^9$ , barrels  $9^e$  in which are housed carriage-propelling means, in the form of clock-springs  $E^2$ . On the right-hand end of said shaft, outside of said plate  $e^6$ , is a ratchet-wheel  $e^{11}$  designed to be operated by a two-throw two-pronged pawl  $e^{12}$  extending into a lever  $e^{13}$  pivoted on the side member  $e$ . It is to be understood that the mechanism just described effects a step-by-step travel of the line-spacing carriage E, for line-spacing. By alternately raising and depressing the pawl-lever, the members thereof will alternately release the ratchet-wheel, and thus effect forward travel of the carriage, in a step-by-step motion, under the impulse of the propelling-spring already referred to. When the carriage has reached the limit of its forward travel, the said springs will, while the carriage is being pushed back, again be placed under the requisite tension to effect forward travel of the carriage.

To enable the operator to determine where to position the carriage at any particular or desired line, I provide a line-finder or indicator  $e^{14}$  pivoted about centrally on a downward-extending piece  $e^{15}$  depending from the left-hand side-member  $e$ , and comprising a pointer  $e^{16}$  (arranged to traverse the longitudinal graduated scale  $e^3$  at the edge of the platen, as already described), an operating-handle  $e^{17}$ , and a transverse scale-portion  $e^{18}$  extending over the platen and pivotally supported at its other end on a depending piece  $e^{19}$  similar to the piece  $e^{15}$ . The graduations on said scale-portion correspond to those on a transverse letter-space scale  $e^{20}$  supported on the portion  $e^2$  of the line-spacing carriage E, hereinafter referred to. The carriage-abutments  $b^8$ , already described as arranged at the rear of the body-portion  $b^2$  of the rails, limit the travel of the line-spacing carriage to the rear and serve, also, to hold the carriage when the rails are tilted. Suspended from the line-spacing carriage E and designed to travel transversely of the platen, is the

spring-driven letter-spacing carriage F comprising a semi-circular frame  $f$ , to which is attached, at the front, brackets  $f^2$ ,  $f^2$ , carrying rollers or wheels  $f^3$ ,  $f^3$ , designed to traverse the front cross-bar  $e^3$  of the line-spacing carriage, and, at the rear, brackets  $f^4$ ,  $f^4$  carrying rollers or wheels  $f^5$ ,  $f^5$ , designed to travel on the upper face of the rear cross-bar  $e^2$ .

I do not, in this application, set up any particular form of escape-mechanism for effecting an intermittent, step-by-step movement to said letter-spacing carriage, the form being that in common use on machines on the market; but for purposes of illustration to exhibit the preferred disposition thereof, I show a pinion  $f^6$ , keyed on the short shaft  $f^7$  and designed to mesh with the rack-bar  $e^7$  which extends between the plates  $e^6$  (see Fig. 10). On said shaft  $f^7$  is a ratchet-wheel  $f^8$  to be engaged by any appropriate form of controlling-device, whereby the travel of the carriage for letter-spacing, under the impulse of any suitable carriage-propelling-power may be governed. In this instance, the mechanism for driving the pinion  $f^6$  consists of an ordinary clock-spring  $5^4$  housed in a barrel  $6^4$ , the latter being, as shown, arranged midway of the machine and back of the type-bars, hereinafter to be described, and below the pivotal points of the key-levers, also hereinafter to be described, and being thus disposed, utilizes space to advantage. The said spring, by being connected to the pinion-shaft  $f^7$ , is placed under tension when the carriage is moved to the left, as usual, and exerts its force to impart the desired step-by-step travel of the carriage, for letter-spacing. Traversing the said rack-bar, and engaging the smooth surface thereof are a pair of wheels or rollers  $f^9$ ,  $f^9$ , and another pair  $f^{10}$ ,  $f^{10}$ , carried by brackets  $f^{11}$ ,  $f^{11}$ ,—these parts of wheels or rollers serving to support and steady the letter-spacing carriage during its travel over the platen. Adjustably disposed on the rack-bar  $e^7$  is a marginal carriage- or limit-stop  $f^{12}$ , for regulating the width of the lines. At the opposite end of the rack-bar  $e^7$  is bell-device  $f^{13}$ , as usual, designed to be tripped and sounded by the lateral travel of the carriage.

The transverse scale  $e^{20}$ , already referred to, is mounted on the line-spacing carriage-frame and extends the entire width thereof. Juxtaposed thereto and traveling with the letter-spacing carriage, is a letter-pointer  $f^{14}$ . The said transverse scale  $e^{20}$  is graduated in a manner similar to the graduations on the scale member  $e^{18}$  which lies adjacent to the upper surface of the platen, so that the operator, having noted the printing point indicated, by the scale  $e^{18}$ , may then move the carriage to the proper position,



being guided in so doing by the pointed  $f^{14}$  as it is moved over the scale  $e^{20}$ . The proper line-position of the writing-mechanism is indicated by the scale  $e^{18}$  relative to the pointer  $e^{16}$  on the longitudinal scale  $c^3$ . By means of the said transverse and longitudinal scales, proper lining up of the work on the platen is accomplished.

In the letter-spacing carriage, are arranged the type-bars  $G$  and the key-levers,  $H$ , the keys  $h, h, h$  of the latter being arranged in banks, as shown in Figs. 1<sup>a</sup>, 4, and 5, and, also, so as to leave an open central space, at the front, to permit vision of the printing area  $h^2$ . In other words, in order that the writing may easily be read from the front of the machine after the ribbon-device (hereinafter described) has been projected sufficiently to the rear to expose the writing-line, and, further, that the letter-spacing carriage may be arranged as close to the platen as practicable, thereby to obviate the objection inherent in some machines of this character, wherein the keys are elevated at such height above the platen as to render it necessary for the arms of the operator to be held in practically horizontal position, I arrange the successive banks of key-levers in gradually increasing lengths and curves; that is to say, the levers of the first or highest row of keys will be shortest and least curved, those of the next row progressively longer and of greater curve, and so on throughout as many keys as may be employed. Space-keys  $h^3$ , at opposite sides of said open space, are supported on key-levers, like those for operating the type-bars, and, in any suitable way, through contact with any preferred form of universal bar (not shown), connecting with the letter-escape-mechanism already adverted to. These key-levers are pivoted at their extremities on the frame  $f$  (Figs. 14 and 15).

The typebars  $G$ , are disposed in a semi-circle, to conform with the said carriage-frame  $f$  and connect with the key-levers through a connecting wire  $g$ , which engages with the lever at  $h^4$  in advance of the fulcrum point of the latter, and with the typebar at  $g^2$ , somewhat above the pivotal-point of the typebar. The type bar is pivoted upon a bar  $g^3$  which is held by the supporting-plate or member  $g^4$ . The typebar carries, on its upper or free end, which is bifurcated for the purposes, a type-carrying head  $g^5$  pivotally disposed on the bar, which is preferably bent forward, as shown. The head carries a plurality of type-characters,—in this instance, three, though a greater or lesser number may, of course, be disposed thereon. Where three type are disposed on the head, the first or uppermost one may be the "lower-case" type; the second or middle one, the "upper-case" type; and the third, a "figure"-type or any arbitrary character.

As usual in multiple type-bearing bars, the "lower-case" type will always be in position to contact with the sheet to be written upon. The typebars may be constructed of any suitable material, combining lightness and strength.

Upon the upper periphery of the head is a trip-arm or projection  $g^6$  extending vertically when the bar is in its normal, upright position. A spring  $g^7$  is secured, at its one end, to the head  $g^5$ , and engages, at its other end, with the curved portion of the bar  $G$ , at  $g^9$ . The rear periphery of the head is provided with three flat faces,  $g^{10}$ ,  $g^{11}$ ,  $g^{12}$ , corresponding to the three type-characters disposed on the opposite periphery of the head. Pivoted between the bifurcated members (between which, also, the head is disposed) at  $g^{13}$  is a pawl  $g^{14}$  which, at its upper end, engages one or another of said flat faces  $g^{10}$ ,  $g^{11}$ ,  $g^{12}$ , and, to retain the head in proper operative position, a spring  $g^{15}$  (secured to the front face of the typebar at  $g^{16}$ , and engaging the lower end  $g^{17}$  of the pawl) serves to maintain the pawl in such engaged position. To actuate the pawl against the stress of its spring  $g^{15}$  and permit the head (after being shifted to one of its plurality of printing positions) to return to normal position, I provide, for each pawl, a resetter member  $g^{18}$ , constituting a projection from, or lug on, the inside face of the plate  $g^4$ . It will be understood that when the typebar has returned to its upright, normal position, the resetter-member  $g^{18}$  will be projected between the bifurcations of the upper end of the bar and engage the lower end of the pawl and rock it on its pivot to throw its upper end out of contact with the head which, under the action of the head-returning spring  $g^7$ , (which, during the shifting of the head, has been placed under tension) reshifts the head and again presents the "lower-case" type to normal position. Thereafter, when the bar is actuated to print, the moment the pawl is disengaged from its resetter-member  $g^{18}$ , it will engage a flat face on the head and serve to hold the head from any tendency to shift itself.

Arranged, normally, above the plane of travel of the trip-arm  $g^6$ , is the head-shifting device, comprising, in this instance, two circular members  $I, J$ , arranged in parallel arcs extending from one end of the frame  $f$  to the other. The member  $I$  is, preferably, provided with vertical slots  $i$ , in which work pins  $j$  mounted on the member  $J$ . The members are, respectively, operated by key-levers,  $I^2$  and  $J^2$ , which will herein be designated, respectively, the cap-key and the fig-key. The said cap-key  $I$  connects with the shifter-member  $I$ , through a link  $i^2$ , and the fig-key with the shifter-member  $J$  through a link  $j^2$ . It is to be noted that the shifter-



members I and J are arranged in alinement relative to the travel of the type-head toward the printing-point. Now, when the cap-key, I<sup>2</sup>, is depressed, the shifter-member is depressed from a position normally out of the path of travel of the trip-arm  $g^6$  into such path in order that said trip-arm  $g^6$  will engage the shifter-member I and, as it continues its arc of movement, effect a shifting of the head to present the capital-letter on the head. In the meantime, the pawl  $g^{14}$  has engaged the head, as already described, and serves to retain it in such shifted position until disengaged, as previously set forth. Now, by reason of the fact that the shifter-member J, in being less removed from the position of the trip-arm  $g^6$ , will be in contact with said trip-arm for a period more extended than that of the engagement of the shifter-member I with said trip-arm, a greater shifting of the head occurs, and, thus, a figure-character is presented, the other operation of the pawl, etc., being the same as just described. By reason of the members I and J being connected by means of the pins  $j$ , movement of the member J effects movement of the member I also, so that, if by any failure the head is not given its full shift for a figure-character during the engagement of the trip-arm  $g^6$  with the shifter-member J, it will be fully actuated if it engages the shifter-member I. By the arrangement described, the type-head is shifted toward the beginning of the downward stroke of the typebar.

Supported on the letter-spacing carriage is the ribbon mechanism K, comprising a circular frame K<sup>2</sup>, at the extremities of which are disposed the ribbon-carriers  $k$ , in this instance, consisting of a plurality of spools between which extend three ribbons, R, R, R passing through guides  $k^2$  underlying the spools. Secured to the frame K<sup>2</sup> and extending forward therefrom intermediate of the ribbon-carriers, is a ribbon-guide  $k^3$ . Extending rearward from the frame K<sup>2</sup>, is a rack-bar  $k^5$  with which meshes a pinion  $k^6$  carried by a short vertical shaft  $k^7$ , upon the upper end of which is a bevel-gear-wheel  $k^8$ , and with this meshes a bevel-gear  $k^9$  disposed on a short horizontal shaft  $k^{10}$ , at the forward end of which is a segment-piece  $k^{11}$ , marked with the designations "Rd" (for red), "Bk" (for black), and "Gr" (for green), the segment being disposed at the forward part of the carriage. By rotating the segment, the rack  $k^5$  is, through said gears, moved forward or backward, and thus the ribbon-carriers are shifted to position one or another of said three ribbons at the printing point; or, if moved far enough to the rear, the printing will, of course, be exposed to view, and vision thereof is facilitated by the arrangement of the keys, as already described. The ribbon-

spools may be rotated in any appropriate manner and by suitable mechanism to effect feeding thereof, such mechanism deriving movement by being connected with the typebar operating mechanism, as usual.

In Figs. 9 to 11, inclusive, I have shown an arrangement wherein the book-supporting and operating-devices are omitted, and the writing-mechanism and platen are stationary relative to the table-top. This form of machine is particularly adapted for writing billing forms or statement-blanks. In this arrangement, the platen is provided with the carbon-holding devices, attached to or separate from the platen, work-holders, etc., already described. The platen, itself, is, however, shown (in Figs. 9 and 10) as hinged to the table at 1° instead of on the hinge-member, as in Fig. 1<sup>a</sup>, and, thus, independent of the superposed rails, and does not rest at its front upon the cross-bar  $b^3$ . By this arrangement, the tilting of the platen and the tracks or rails independent one of the other is rendered possible.

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

1. In a typewriter, the combination with a flat-platen, of tracks or rails disposed adjacent to, but independent of and normally occupying a plane away from the platen to present a clear space between said platen and the tracks or rails, a carriage suspended from said tracks, a second carriage mounted on said first-mentioned carriage, downward-acting writing-mechanism mounted on the last-mentioned carriage, line-, and letter-spacing mechanisms mounted on the first- and last-mentioned carriages respectively and movable therewith, and key-mechanism for operating the said writing-mechanism, substantially as described.

2. In a typewriter, the combination with a tiltable flat platen, elevated tracks disposed above and movable independent of, and normally occupying a plane away from, the platen, the platen being hinged at its one edge, being tiltable independent of the tracks, and constructed to be elevated bodily with the tracks, a traveling carriage suspended from said tracks, downward-acting writing-mechanism mounted in said traveling carriage, letter- and line-spacing mechanism, and key-mechanism for operating the writing-mechanism, substantially as described.

3. In a typewriter, the combination with a flat platen, a downward-acting writing-mechanism operable longitudinally and transversely over said platen and, elevated tracks normally located a distance away from the operative surface of the platen and constituting a support for the writing-mechanism, means cooperating with said elevated tracks for effecting line-spacing of the writ-



ing-mechanism and means for effecting letter-spacing of the writing-mechanism, substantially as described.

4. In a typewriter, the combination with a flat platen, a downward-acting writing-mechanism operable longitudinally and transversely over said platen, and elevated tracks, normally located a distance away from the operative surface of the platen and constituting a support for the writing-mechanism, and means cooperating with said elevated tracks for effecting line-spacing of the writing-mechanism, substantially as described.

5. In a typewriter, the combination with a flat platen, a downward-acting writing-mechanism operable longitudinally and transversely over said platen, and elevated tracks, normally located a distance away from the operative surface of the platen and constituting a support for the writing-mechanism, instrumentalities supported upon the writing-mechanism and cooperating with said elevated tracks to effect line-spacing of the writing-mechanism, and independent means for effecting letter-spacing thereof, substantially as described.

6. In a typewriter, the combination with a movable flat platen, downwardly-acting writing-mechanism suspended above and free of the platen and constructed to travel transversely and longitudinally thereover, key-members constituting a part of said writing-mechanism and arranged to present a central open space for viewing the platen, substantially as described.

7. In a typewriter, the combination with a movable platen, tracks arranged above the platen and independent thereof, and means for effecting movement of the platen simultaneously with the tracks, substantially as described.

8. In a typewriter, the combination with a flat platen, a supporting-member for sustaining the platen at its rear, track-members overlying, but elevated above, the plane of the platen, and writing-mechanism suspended from said track-members and adapted to have travel transverse and longitudinal of the platen.

9. In a typewriter, the combination with a flat, tiltable platen, a base constituting a support for the platen, a supporting-frame hinged to the base independent of the platen, and writing-mechanism movable transversely and longitudinally over the platen and suspended from the supporting-frame, substantially as described.

10. In a typewriter, the combination with writing-mechanism, of a tiltable platen, tracks arranged a distance away from the operative surface of the platen and independent thereof to present a clear space between the platen and the tracks, and constituting a support from which the writing-

mechanism is suspended and means cooperating with said tracks for effecting line-spacing of the writing-mechanism, substantially as described.

11. In a typewriter, the combination with a flat platen, tracks arranged a distance away from the operative surface of the platen and independent thereof to present a clear space between the platen and the tracks, a longitudinally-movable carriage suspended from the tracks, a transversely-movable carriage, means provided on the laterally-movable carriage for effecting letter-spacing, and means disposed on the longitudinally-movable carriage for effecting line-spacing, substantially as described.

12. In a typewriter, a flat platen, supporting tracks disposed above and away from the platen, standards for sustaining said tracks and constituting a support for the platen, and a writing-mechanism carriage suspended and movable upon said tracks.

13. In a typewriter, a flat platen, supporting-tracks disposed above and away from the platen, movable standards for sustaining said tracks and constituting a support for the platen, a writing-mechanism carriage supported and movable upon said tracks, and means for moving said standards and adapted to elevate the writing-mechanism carriage.

14. In a typewriter, a flat platen, movable tracks connected together to constitute a frame disposed a distance away from the operative surface of said platen, and means for elevating said tracks at their forward and rear ends and, thus, throughout their extent substantially as described.

15. In a typewriter, a flat platen, supporting tracks connected together to constitute a frame disposed a distance away from the operative surface of and independent of the platen, and means for elevating said tracks at their forward and rear ends and, thus, throughout their extent, substantially as described.

16. In a typewriter, a flat platen, tiltable tracks connected together to constitute a frame disposed a distance away from the operative surface of said platen, and means for moving said tracks at their forward and rear ends and, thus, throughout their extent, substantially as described.

17. In a typewriter, a flat platen, tiltable tracks connected together to constitute a frame disposed a distance away from the operative surface of said platen, and means for moving said tracks at their forward and rear ends and, thus, throughout their extent, substantially as described.

18. In a typewriter, the combination with a flat-platen, of tracks elevated above the platen and having downward extending front portions, a bar connecting said front portions and adapted to form a support for



the forward end of the platen, a writing-mechanism supported on said tracks, and instrumentalities cooperating with said tracks to effect line-spacing of the writing-mechanism.

19. In a typewriter, a hinged flat platen, and tracks normally disposed a distance away from the operative surface of the platen to present a clear space between the platen and the tracks, said tracks being connected with each other for supporting a longitudinally-traveling writing-mechanism and means cooperating with said tracks for effecting line-spacing of the writing-mechanism, substantially as described.

20. In a typewriter, the combination with a flat-platen, of a writing-mechanism, tiltable tracks disposed normally to occupy a position away from the platen and connected with each other for supporting the writing-mechanism, and instrumentalities cooperating with said tracks for effecting line-spacing of the writing mechanism.

21. In a typewriter, a flat platen, elevated tracks, upstanding standards upon which the tracks are arranged, and means for elevating the same to predetermined heights, substantially as described.

22. In a typewriter, the combination with a flat-platen, of a writing-mechanism, tracks elevated at a fixed height above and free of the platen, and instrumentalities cooperating with said tracks for effecting line-spacing of the writing-mechanism.

23. In a typewriter, the combination with a tiltable flat platen, of a writing mechanism, tracks hinged at their rear and connected at their forward ends and disposed to occupy, normally, a position above the plane of, and away from, the operative surface of the platen to present a clear space between the platen and tracks, and instrumentalities cooperating with said tracks for effecting line-spacing of the writing-mechanism.

24. In a typewriter, the combination with a hinged, tiltable flat platen, of a writing mechanism, tracks normally occupying a position above the plane of, and elevated from the operative surface of, said platen to present a clear space between said tracks and platen, and instrumentalities cooperating with said tracks for effecting line-spacing of the writing-mechanism.

25. In a typewriter, the combination with a flat platen, marginally-graduated, of elevated tiltable tracks, normally disposed to occupy a position away from the operative surface of the platen, writing-mechanism carried thereby and carrying a pointer cooperating with the graduations on the platen to indicate line-spacing, substantially as described.

26. In a typewriter, the combination with a flat platen, of work-holding clamping-

devices bearing upon the upper surface of the platen, and manually- and foot-operated means for raising the clamping devices to permit insertion and withdrawal of the work, substantially as described.

27. In a typewriter, a flat tiltable platen, tiltable tracks disposed normally away from the operative surface of and independent of the platen and connected at their forward ends, writing-mechanism supported on the tracks and movable transversely and longitudinally over the platen, instrumentalities cooperating with said tiltable tracks for effecting line-spacing of the writing-mechanism, and means carried by the tracks for limiting backward travel of the carriage, substantially as described.

28. In a typewriter, a flat platen, tiltable tracks connected at their forward ends and arranged normally away from the operative surface of the platen and free thereof, a rack-plate carried by the tracks, a writing-mechanism carriage supported on the tracks and movable thereon longitudinally, and mechanism carried by the writing-mechanism carriage and cooperating with the track-rack for effecting line-spacing of the writing-mechanism, substantially as described.

29. In a typewriter, a flat platen, elevated, tiltable tracks occupying a position a distance away from the operative surface of the platen, to present an interval between the platen and the tracks, a supporting frame carried thereby and movable longitudinally thereon, a carriage disposed and movable transversely upon the supporting frame, means for effecting movement of the carriage on the supporting-frame for letter-spacing and instrumentalities cooperating with said elevated tracks for effecting line-spacing of the carriage, substantially as described.

30. In a typewriter, a flat platen, elevated tracks disposed above the platen, and at such a distance therefrom as to provide an interval between the platen and the tracks, a frame movable longitudinally upon the tracks, a carriage movable transversely upon the supporting-frame, carriage-self-propelling mechanism carried thereby and cooperating with said elevated tracks for effecting travel of said movable frame for, and in the direction of, line-spacing, substantially as described.

31. In a typewriter, a flat platen, elevated tracks disposed over the platen, a rack-bar carried on the underside of the track, a supporting frame movable upon the tracks, mechanism carried by the supporting-frame and cooperating with the rack-bar on the track for effecting intermittent movement of the frame for line spacing, rollers carried by the supporting-frame and designed to travel upon the tracks, a carriage supported on the frame and movably suspended by the



same over the platen, and means for effecting movement of the carriage upon its supporting-frame, substantially as described.

32. In a typewriter, a flat platen, a scale device carried thereby, elevated tracks disposed over the same, a supporting frame carried by the tracks, means for effecting movement thereof, a combined work-holder and pointer carried thereby and cooperating with the scale device carried by the platen, a carriage movable transversely on the supporting frame, and means carried by the supporting-frame and carriage for indicating letter-spacing, substantially as described.

33. In a typewriter, the combination with a flat platen, elevated tracks disposed over the same, a supporting frame movable longitudinally on the tracks, a rack-bar carried by the supporting-frame, a carriage supported at its front and rear upon the supporting-frame and movable transversely on the same and being suspended therefrom over the platen, letter-spacing mechanism carried thereby and cooperating with the rack-bar on the supporting-frame for effecting intermittent movement of the carriage upon its supporting-frame, means for limiting movement of the carriage on its frame and instrumentalities cooperating with said elevated tracks for effecting line-spacing of the supporting-frame, substantially as described.

34. In a typewriter, a flat platen, elevated tracks, a supporting-frame movable upon the tracks, a carriage movable transversely upon the supporting-frame, typebars with their connections carried by the carriage, ribbon-mechanism also carried by the carriage, means for effecting movement of the carriage upon the supporting-frame and instrumentalities cooperating with said elevated tracks for effecting line-spacing of the supporting-frame, substantially as described.

35. In a typewriter, a flat platen, a movable rest operable beneath the platen, elevated tracks, writing-mechanism suspended between said tracks and instrumentalities cooperating with said elevated tracks for effecting line-spacing of the writing-mechanism, substantially as described.

36. In a typewriter, a flat platen, elevated tracks disposed above and free of the platen, a writing-mechanism carriage suspended between the tracks and movable longitudinally and transversely, a plurality of key-members carried by said writing-mechanism carriage and aggrouped in banks to form two sections, said sections being separated to form a central open space, substantially as described and shown.

37. In a typewriter, a flat platen, tracks disposed over the platen, writing-mechanism suspended between the tracks and carrying

typebars provided with movable spring-controlled heads to be actuated toward the beginning of their downward stroke, and means for actuating the same and means for returning the same to normal position, substantially as described.

38. In a typewriter, the combination with a flat platen, of overlying tracks, a writing-mechanism supported and movable on said tracks, and a movable work-support arranged beneath the platen.

39. In a typewriter, the combination with a flat platen, of overlying tracks, a writing-mechanism supported and movable on said tracks, and a laterally sliding work-support arranged beneath said platen.

40. In a typewriter, the combination with a flat platen, of overlying hinged tracks, a writing-mechanism supported and movable on said tracks, and a laterally sliding work-support arranged beneath the platen.

41. In a typewriter, the combination with a flat-platen, of a hinged track-frame, and a frame for supporting a manifolding sheet above the platen.

42. In a typewriter, the combination with a flat-platen, of a track-frame, an inking-element disposed in juxtaposition thereto, and a device for supporting a manifolding-sheet above the platen.

43. In a typewriter, the combination with a flat-platen, of a track-frame, an inking-element arranged in juxtaposition thereto, and a device for supporting a manifolding-sheet in cooperative relation to the platen.

44. In a typewriter, the combination with a flat-platen, of a track-frame, and means carried by the track-frame for supporting a manifolding sheet above the platen.

45. In a typewriter, the combination with a flat platen, of a track-frame, and a frame pivotally secured to said track-frame for supporting a manifolding sheet above the platen.

46. In a typewriter, the combination with a flat-platen, of a track-frame, and a frame carried by the track-frame and movable with relation thereto, for supporting a manifolding sheet above the platen.

47. In a typewriter, the combination with a flat-platen, of tracks or rails disposed adjacent to, but independent of and normally occupying a plane away from, the platen to present a clear space between said platen and the tracks or rails, a carriage adapted to traverse said tracks, a second carriage mounted on said first-mentioned carriage, downward-acting writing-mechanism mounted on the last-mentioned carriage, line-, and letter-spacing mechanisms mounted on the first- and last-mentioned carriages respectively and movable therewith, and key-mechanism for operating the said writing-mechanism, substantially as described.

48. In a typewriter, the combination with



a tiltable flat-platen, elevated tracks occupying a plane above and to one side and independently of the side edges of the platen to permit tilting of said platen between the tracks, a traveling carriage supported on said tracks, and a downward-acting writing-mechanism embodied therein.

49. In a typewriter, the combination with a tiltable flat-platen, downwardly-acting writing-mechanism suspended above and free of the side edges of the platen to permit tilting of said platen between the tracks and constructed to travel transversely and longitudinally thereover, key-members constituting a part of said writing-mechanism and arranged to present a central open space for viewing the platen, substantially as described.

50. In a typewriter, the combination with a tiltable flat-platen, tracks arranged a distance away from the operative surface of the platen and independent thereof to present a clear space between the side edges of the platen and the tracks to permit tilting of said platen between said tracks, a longitudinally-movable carriage adapted to traverse the tracks, a transversely-movable carriage, means provided on the laterally-movable carriage for effecting letter-spacing, and means disposed on the longitudinally-movable carriage for effecting line-spacing, substantially as described.

51. In a typewriter, a tiltable flat-platen, supporting tracks normally occupying a plane away from the platen to present a clear space between the side edges of the platen and the tracks to permit tilting of said platen between said tracks, means for supporting said tracks and constituting a support for the platen, and a writing-mechanism carriage adapted to traverse said tracks.

52. In a typewriter, a flat-platen, supporting tracks normally occupying a plane away from the platen to present a clear space between the platen and the tracks, means for supporting said tracks and constituting a support for the platen, a writing-mechanism carriage adapted to traverse said tracks, and means for gaging, locating and clamping a work-sheet sustained by the platen.

53. In a typewriter, a tiltable flat-platen, a supporting track-frame normally occupying a plane beyond the operative surface of the platen to present a clear space between the side edges of the platen and the tracks to permit tilting of said platen between said tracks, the latter extending beyond the rear edge of the platen.

54. In a typewriter, a tiltable flat-platen, a supporting track-frame normally occupying a plane beyond the operative surface of the platen to present a clear space between the side edges of the platen and the track-

frame to permit tilting of said platen through said frame extending beyond the rear edge of the platen, and means for moving the track-frame.

55. In a typewriter, a flat-platen, a hinged supporting track-frame normally occupying a plane beyond the operative surface of the platen to present a clear space between the platen and the track-frame and extending beyond the rear edge of the platen, and means for moving the track-frame.

56. In a typewriter, a tiltable flat-platen, a writing-mechanism movable in two directions thereover, writing-mechanism-supporting-tracks normally occupying a plane beyond the operative surface of the platen to present a clear space between the tracks and sides of the platen to permit tilting of said platen between said tracks, and instrumentalities cooperating with said tracks to effect line-spacing of the writing-mechanism.

57. In a typewriter, the combination with a flat-platen, a graduated gage-member occupying a position adjacent one edge of the platen for lining up a sheet supported thereon, tracks normally occupying a plane beyond the operative surface of the platen to present a clear space between the platen and the tracks, a writing-mechanism adapted to traverse said tracks, and instrumentalities cooperating with said tracks for effecting line-spacing of the writing-mechanism.

58. In a typewriter, the combination with a flat-platen, a graduated gage-member adjacent thereto, tracks normally occupying a plane beyond the operative surface of the platen to present a clear space between the platen and the tracks, instrumentalities cooperating with said tracks for effecting line-spacing of the writing-mechanism, and a pointer carried by said writing-mechanism and cooperating with the graduated-member.

59. In a typewriter, a flat-platen, writing-mechanism adapted to travel over the platen, a gage-member mounted on the platen, tracks disposed independently of the gage-member and platen and adapted for supporting the writing-mechanism, and instrumentalities cooperating with said tracks for effecting spacing of the writing-mechanism.

60. In a typewriter, a flat-platen, writing-mechanism adapted to travel over the platen, a graduated gage-member mounted on the platen and within the writing area of the writing-mechanism and adapted to line up a work-sheet sustained by the platen and in relation to the line-spacing movements of the writing-mechanism, tracks for supporting the writing-mechanism, and instrumentalities cooperating with said tracks for effecting spacing of the writing-mechanism.

61. In a typewriter, a flat-platen, a writing-mechanism-carriage adapted to travel over the platen, a gage-member disposed adjacent to an edge of the platen, tracks upon



which said carriage is adapted to travel, and a clamping-member distinct from said tracks and cooperating with the platen to retain a sheet sustained thereby.

62. In a typewriter, a flat-platen, a writing-mechanism-carriage adapted to travel over the platen, tracks for supporting said writing-mechanism, a gage-member disposed adjacent to an edge of the platen and distinct from said tracks, and a clamping-member cooperating with the platen to retain a sheet sustained thereby.

63. In a typewriter, a flat-platen, a writing-mechanism-carriage adapted to travel over the platen, a gage-member disposed parallel to one edge of the platen and to the path of travel of the writing-mechanism, a clamping-member cooperating with the platen to retain a sheet sustained thereby, and carbon-carrying means for sustaining a carbon-element over the platen.

64. In a typewriter, a flat-platen, a writing-mechanism-carriage adapted to travel over the platen, a gage-member disposed parallel to one edge of the platen and to the path of travel of the writing-mechanism, a clamping-member cooperating with the platen to retain a sheet sustained thereby, and a plurality of carbon-carrying elements for sustaining a plurality of carbon-elements over the platen.

65. In a typewriter, a flat-platen, a writing-mechanism-carriage adapted to travel over the platen, a gage-member disposed parallel to one edge of the platen and to the path of travel of the writing-mechanism, a clamping-member, cooperating with the platen to retain a sheet sustained thereby, carbon-carrying means for sustaining a carbon-element over the platen, and means for positioning said carbon-element relatively to the operative surface of the platen.

66. In a typewriter, a flat-platen, a writing-mechanism-carriage adapted to travel over the platen, a gage-member disposed parallel to one edge of the platen and to the path of travel of the writing-mechanism, a clamping-member cooperating with the platen to retain a sheet sustained thereby, carbon-carrying means for sustaining a carbon-element over the platen, and means for operating said carbon-carrying element and clamping-member.

67. In a typewriter, the combination with a flat-platen, of work-holding clamping-devices bearing upon the upper surface of the platen, and foot-operated means for raising the clamping devices to permit insertion and withdrawal of the work, substantially as described.

68. In a typewriter, a tiltable flat platen, tracks disposed normally away from the operative surface of and independent of the side edges of the platen and connected at their forward ends, writing-mechanism sup-

ported on the tracks and movable transversely and longitudinally over the platen, instrumentalities cooperating with said tracks for effecting line-spacing of the writing-mechanism, and means carried by the tracks for limiting backward travel of the carriage, substantially as described.

69. In a typewriter, a tiltable flat-platen, tracks connected at their forward ends and arranged normally away from the operative surface of the platen and free of its side edges, said platen having a tilting movement between said tracks, a rack-plate carried by the tracks, a writing-mechanism carriage supported on the tracks and movable thereon longitudinally, and mechanism carried by the writing-mechanism carriage and cooperating with the track-rack for effecting line-spacing of the writing-mechanism, substantially as described.

70. In a typewriter, a flat-platen, carriage-supporting tracks, a line-spacing carriage movable longitudinally upon the tracks, and carriage-self-propelling mechanism carried by and movable with said line-spacing carriage for effecting travel of the same in the direction of line-spacing.

71. In a typewriter, a flat-platen, a book-support movable transversely of the platen and in a horizontal plane, tracks, and a writing-mechanism supported on said tracks and movable over the platen in two directions.

72. In a typewriter, a flat-platen, a book-support movable in a horizontal plane beneath the platen, and a writing-mechanism supported on said tracks and movable over the platen in two directions.

73. In a typewriter, a flat-platen, a book-support movable in a horizontal plane beneath the platen, a writing-mechanism supported on said tracks and movable over the platen in two directions, and means for adjusting the platen and tracks vertically away from the book-support.

74. In a typewriter, a flat-platen, a book-support movable in a horizontal plane beneath the platen, a writing-mechanism supported on said tracks and movable over the platen in two directions, means for adjusting the platen and tracks vertically away from the book-support, and means for holding said platen and tracks in one of a plurality of its adjusted positions.

75. In a typewriter, a movable flat-platen, a book-support movable in a horizontal plane beneath the platen, and a writing-mechanism supported on said tracks and movable over the platen in two directions.

76. In a typewriter, a flat-platen, a book-support slidable in a horizontal plane and beneath the platen, tracks overlying said book-support, and writing-mechanism supported on said tracks and movable in two directions over the platen.

77. In a typewriter, a flat-platen, a book-



support slidable in a horizontal plane and beneath the platen, tracks overlying said book-support, writing-mechanism supported on said tracks and movable in two directions over the platen, and means for moving said platen away from said book-support.

78. In a typewriter, a laterally shiftable book-support, writing-mechanism supported above said book-support, a platen, writing-mechanism-supporting tracks, and means for moving one of said two last-mentioned elements away from said book-support.

79. In a typewriter, the combination with a flat-platen, of a carriage-supporting frame, a secondary frame normally occupying a coöperative relation to the operative surface of the platen and operable thereover to position a manifolding-sheet above said operative surface of the platen.

80. In a typewriter, a flat-platen, machine-supporting tracks, a writing-mechanism carriage mounted to travel on said tracks over said platen, a plurality of key-members carried by said carriage and aggregated in banks to form a plurality of sections, said sections being separated to form a central open space for viewing the writing-line on the platen.

81. In a typewriter, the combination with a platen, of a carriage-supporting device, an inking-element arranged in juxtaposition thereto, and a frame for supporting a manifolding sheet in operative relation to the platen.

82. In a typewriter, the combination with a platen and a carriage-supporting device, an inking-element arranged in juxtaposition thereto, and a sheet-supporting member for supporting a manifolding sheet over the operative surface of the platen.

83. In a typewriter, the combination with a flat-platen, of a hinged track-frame, and a skeleton-frame for supporting a manifolding sheet above the platen.

84. In a typewriter, the combination with a flat-platen, of a track-frame, and a tiltable skeleton-frame movable independently of the track-frame, for supporting a manifolding sheet above the platen.

85. In a typewriter, the combination with

a flat-platen, of a track-frame and a tiltable skeleton-frame carried by the track-frame and also adapted to have movement while the track-frame remains stationary, for supporting a manifolding sheet above the platen.

86. In a typewriter, a platen, a manifolding-element, and a sheet-supporting member to which said manifolding-element is attached, said member being movable toward and away from the platen for positioning said manifolding-element over the operative surface of the same.

87. In a typewriter, a platen, a manifolding-element, and a shiftable sheet-supporting member to which said manifolding-element is attached, said member being adapted to locate said manifolding-element in any of a plurality of operative positions over the platen.

88. In a typewriter, a platen, a manifolding-element, and a combined work-clamping and sheet-supporting member to which said manifolding-element is attached, said member being movable toward and away from the platen for positioning said manifolding-element over the operative surface of the same.

89. In a typewriter, a platen, a manifolding-element, and a shiftable combined work-clamping and sheet-supporting member to which said manifolding-element is attached and adapted for locating said element in any of a plurality of operative positions over the platen.

90. In a typewriter, the combination with a platen, of a carriage-support, and a sheet-supporting and positioning frame pivotally secured to and slidable on said support.

91. In a typewriter, the combination with a flat-platen, of a track-frame, and a frame pivotally secured to and slidable on said track-frame for supporting a manifolding sheet above the platen.

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

GEORGE W. DONNING.

Witnesses:

FREDERICK W. SPARKS,  
JAS. CROOKE McLEER.

Correction in Letters Patent No. 970,195.

It is hereby certified that Letters Patent No. 970,195, granted September 13, 1910, upon the application of George W. Donning, of New York, N. Y., for an improvement in "Book Type-Writers," were erroneously issued to the inventor, said Donning and Harry T. Ambrose, jointly; whereas said Letters Patent should have been issued to *said Ambrose* as assignee of the entire interest in said invention as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of October, A. D., 1910.

[SEAL.]

E. B. MOORE,  
*Commissioner of Patents.*



support slidable in a horizontal plane and beneath the platen, tracks overlying said book-support, writing-mechanism supported on said tracks and movable in two directions over the platen, and means for moving said platen away from said book-support.

78. In a typewriter, a laterally shiftable book-support, writing-mechanism supported above said book-support, a platen, writing-mechanism-supporting tracks, and means for moving one of said two last-mentioned elements away from said book-support.

79. In a typewriter, the combination with a flat-platen, of a carriage-supporting frame, a secondary frame normally occupying a coöperative relation to the operative surface of the platen and operable thereover to position a manifolding-sheet above said operative surface of the platen.

80. In a typewriter, a flat-platen, machine-supporting tracks, a writing-mechanism carriage mounted to travel on said tracks over said platen, a plurality of key-members carried by said carriage and aggregated in banks to form a plurality of sections, said sections being separated to form a central open space for viewing the writing-line on the platen.

81. In a typewriter, the combination with a platen, of a carriage-supporting device, an inking-element arranged in juxtaposition thereto, and a frame for supporting a manifolding sheet in operative relation to the platen.

82. In a typewriter, the combination with a platen and a carriage-supporting device, an inking-element arranged in juxtaposition thereto, and a sheet-supporting member for supporting a manifolding sheet over the operative surface of the platen.

83. In a typewriter, the combination with a flat-platen, of a hinged track-frame, and a skeleton-frame for supporting a manifolding sheet above the platen.

84. In a typewriter, the combination with a flat-platen, of a track-frame, and a tiltable skeleton-frame movable independently of the track-frame, for supporting a manifolding sheet above the platen.

85. In a typewriter, the combination with

a flat-platen, of a track-frame and a tiltable skeleton-frame carried by the track-frame and also adapted to have movement while the track-frame remains stationary, for supporting a manifolding sheet above the platen.

86. In a typewriter, a platen, a manifolding-element, and a sheet-supporting member to which said manifolding-element is attached, said member being movable toward and away from the platen for positioning said manifolding-element over the operative surface of the same.

87. In a typewriter, a platen, a manifolding-element, and a shiftable sheet-supporting member to which said manifolding-element is attached, said member being adapted to locate said manifolding-element in any of a plurality of operative positions over the platen.

88. In a typewriter, a platen, a manifolding-element, and a combined work-clamping and sheet-supporting member to which said manifolding-element is attached, said member being movable toward and away from the platen for positioning said manifolding-element over the operative surface of the same.

89. In a typewriter, a platen, a manifolding-element, and a shiftable combined work-clamping and sheet-supporting member to which said manifolding-element is attached and adapted for locating said element in any of a plurality of operative positions over the platen.

90. In a typewriter, the combination with a platen, of a carriage-support, and a sheet-supporting and positioning frame pivotally secured to and slidable on said support.

91. In a typewriter, the combination with a flat-platen, of a track-frame, and a frame pivotally secured to and slidable on said track-frame for supporting a manifolding sheet above the platen.

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

GEORGE W. DONNING.

Witnesses:

FREDERICK W. SPARKS,  
JAS. CROOKE McLEER.

Correction in Letters Patent No. 970,195.

It is hereby certified that Letters Patent No. 970,195, granted September 13, 1910, upon the application of George W. Donning, of New York, N. Y., for an improvement in "Book Type-Writers," were erroneously issued to the inventor, said Donning and Harry T. Ambrose, jointly; whereas said Letters Patent should have been issued to *said Ambrose* as assignee of the entire interest in said invention as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of October, A. D., 1910.

[SEAL.]

E. B. MOORE,  
Commissioner of Patents.



It is hereby certified that Letters Patent No. 970,195, granted September 13, 1910, upon the application of George W. Donning, of New York, N. Y., for an improvement in "Book Type-Writers," were erroneously issued to the inventor, said Donning and Harry T. Ambrose, jointly; whereas said Letters Patent should have been issued to *said Ambrose* as assignee of the entire interest in said invention as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of October, A. D., 1910.

[SEAL.]

E. B. MOORE,  
*Commissioner of Patents.*