

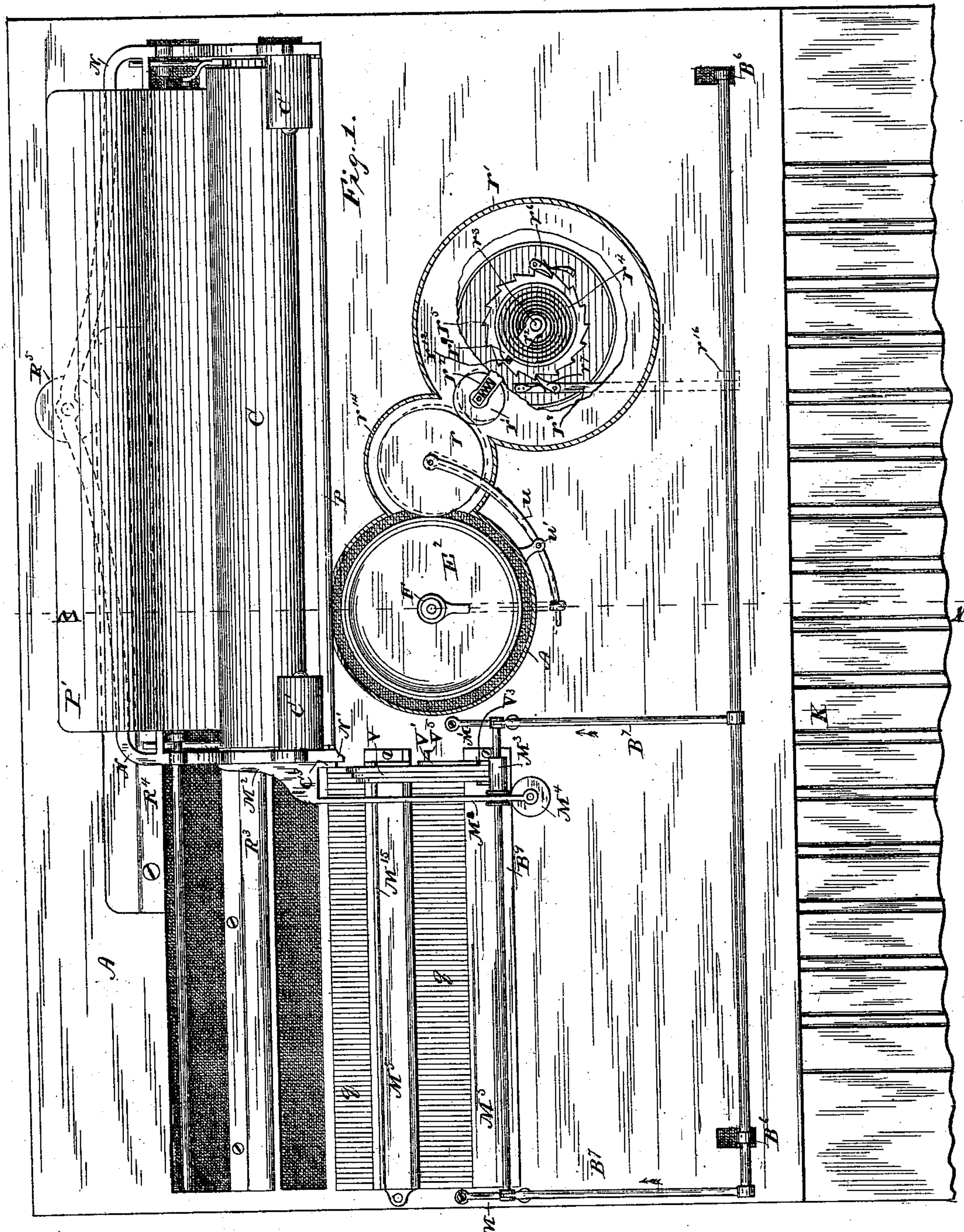
(No Model.)

7 Sheets—Sheet 1.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.



Witnesses.
Chas. R. Burr.
A. J. Stewart.

Inventor
Chas. T. Moore

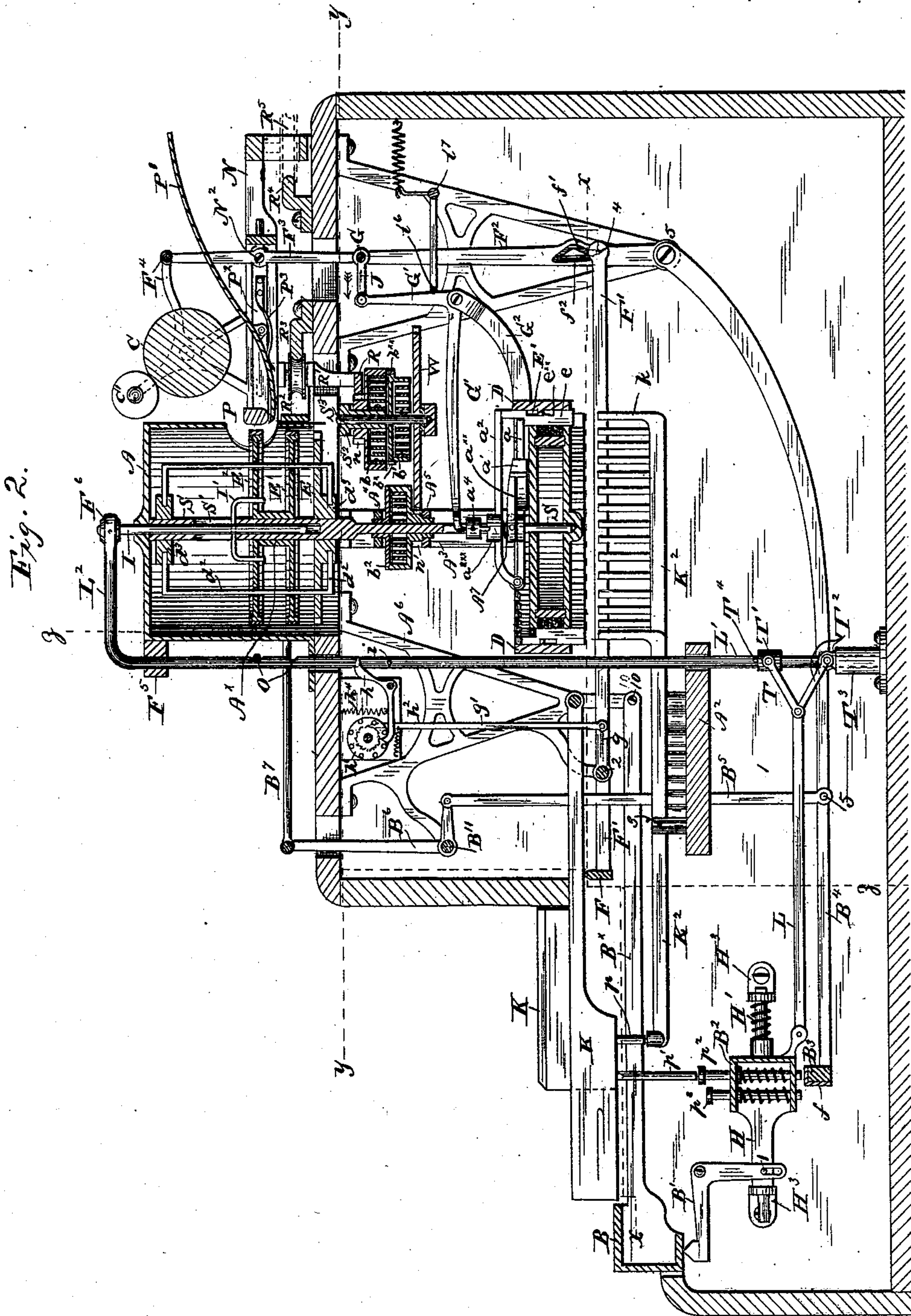
(No Model.)

7 Sheets—Sheet 2.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.



Witnesses.
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(No Model.)

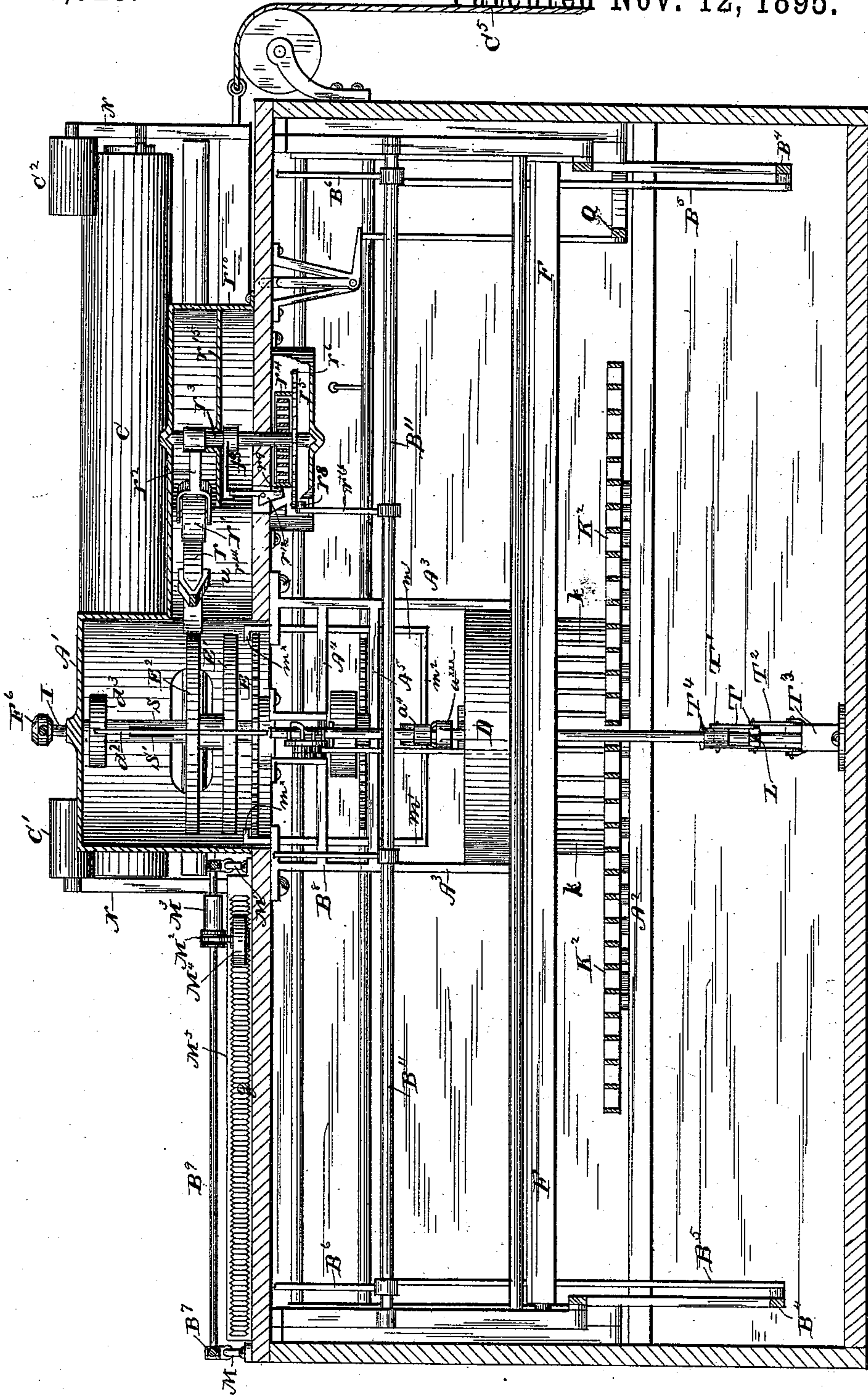
7 Sheets—Sheet 3.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.

Fig. 3.



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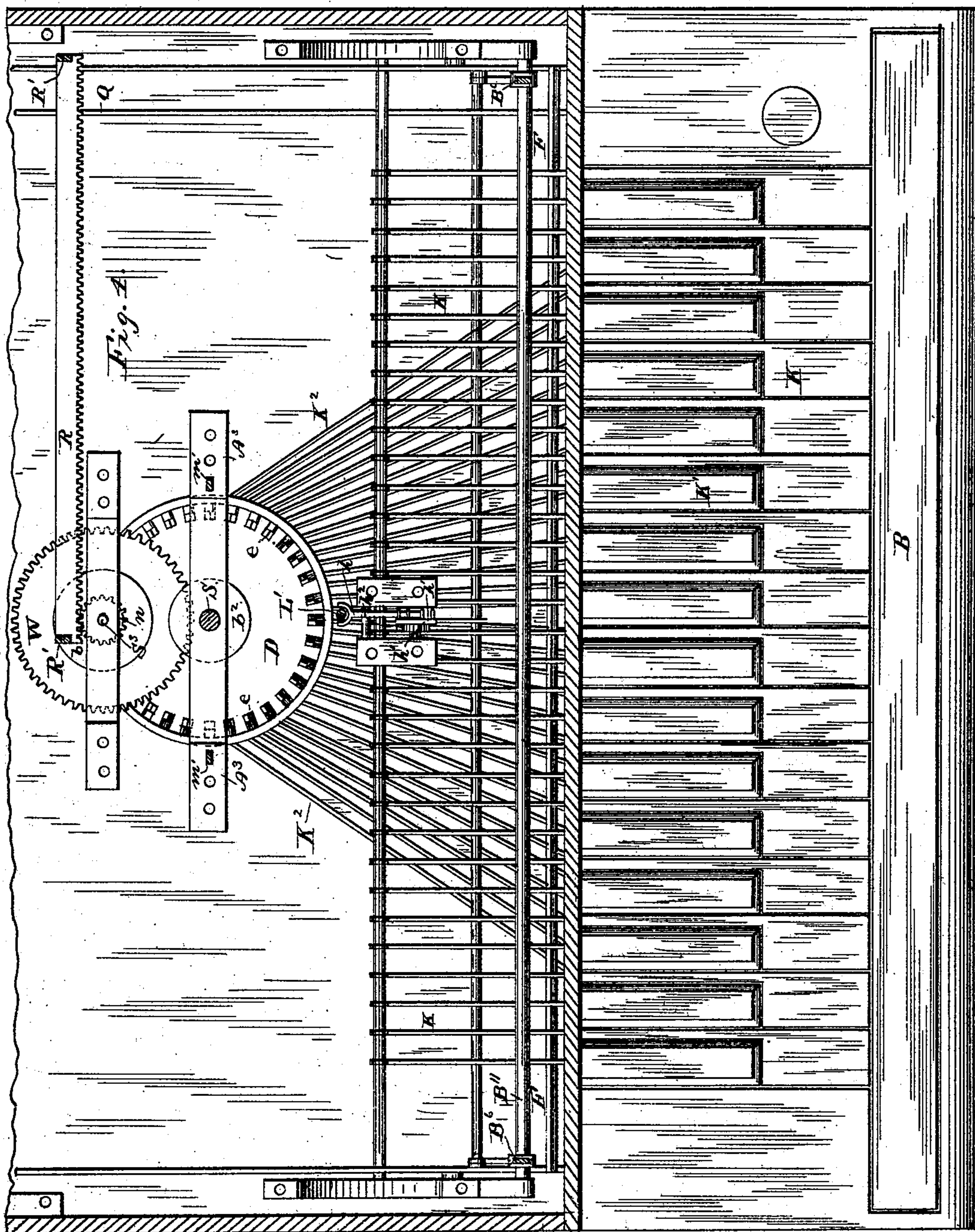
(No Model.)

7 Sheets—Sheet 4.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.



Witnesses.

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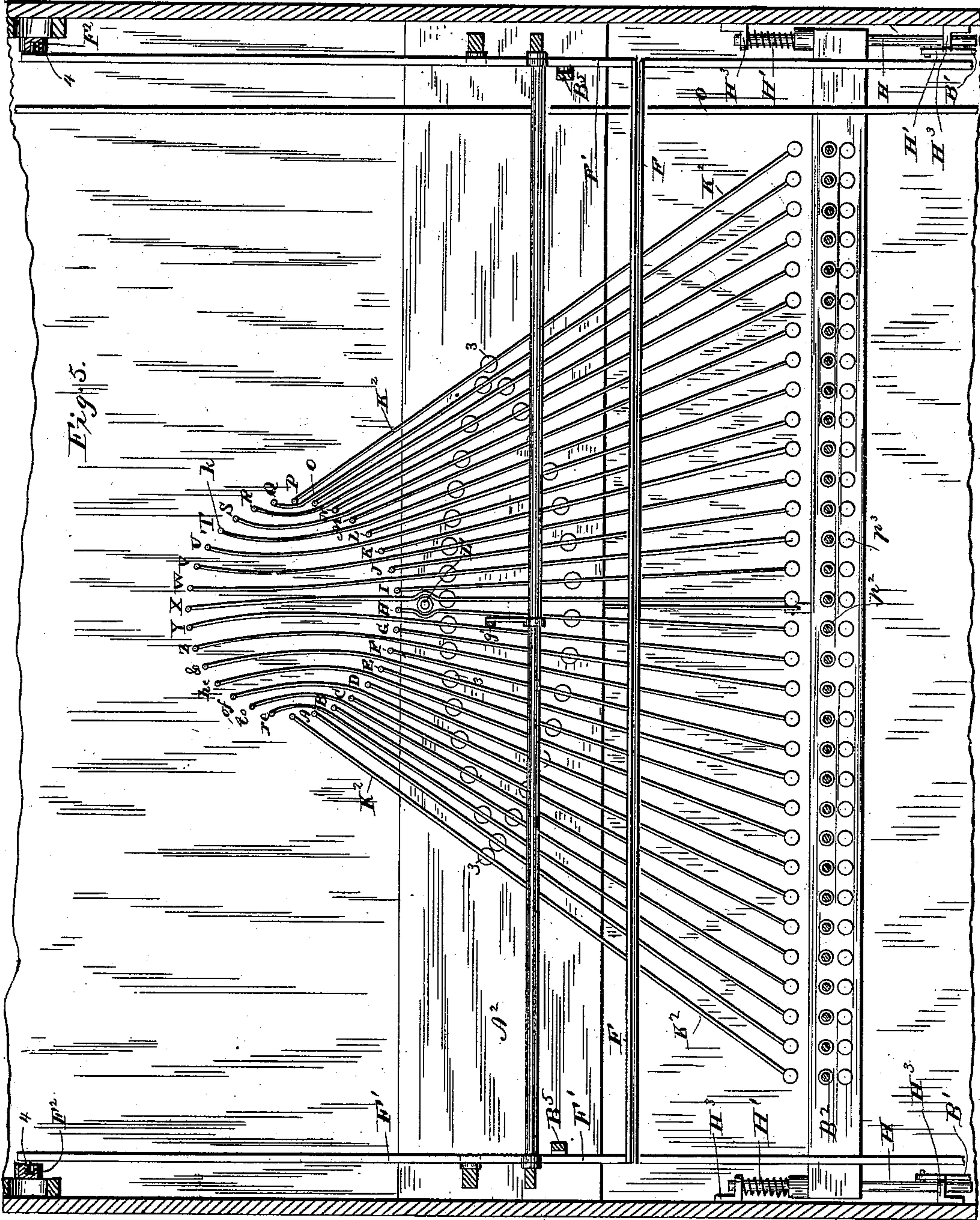
(No Model.)

7 Sheets—Sheet 5.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.



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Inventor.
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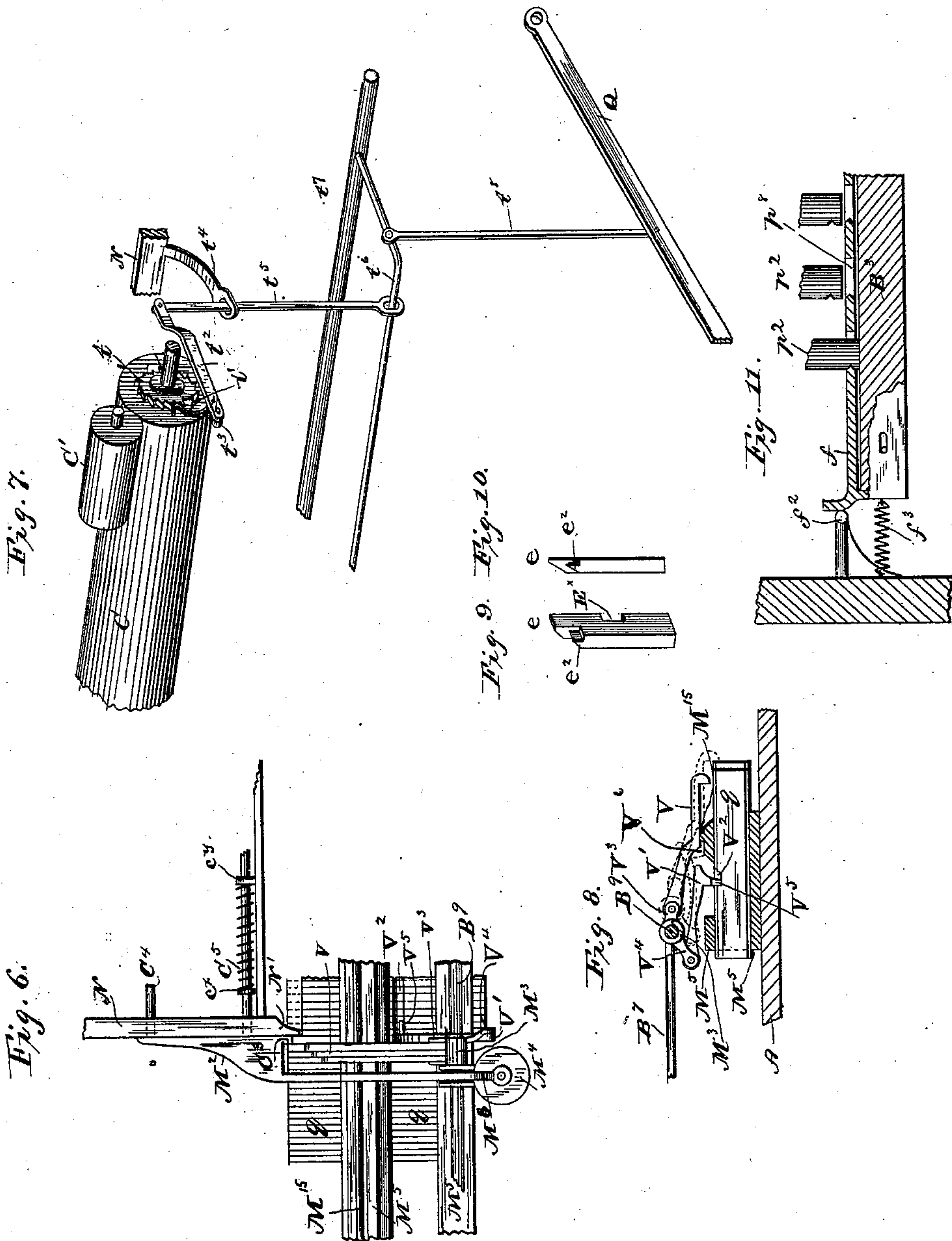
(No Model.)

7 Sheets—Sheet 6.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.



Witnesses.
Chas. R. Runn
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Chas. T. Moore

(No Model.)

7 Sheets—Sheet 7.

C. T. MOORE.
TYPE WRITING MACHINE.

No. 549,523.

Patented Nov. 12, 1895.

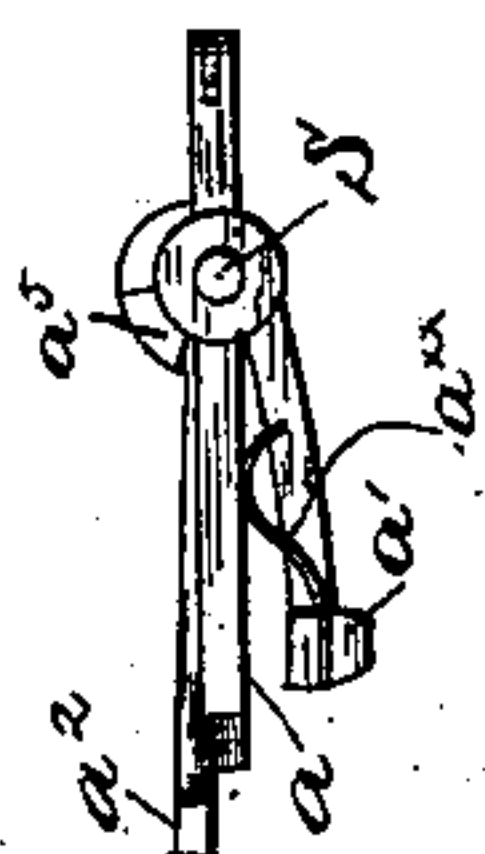


Fig. 15.

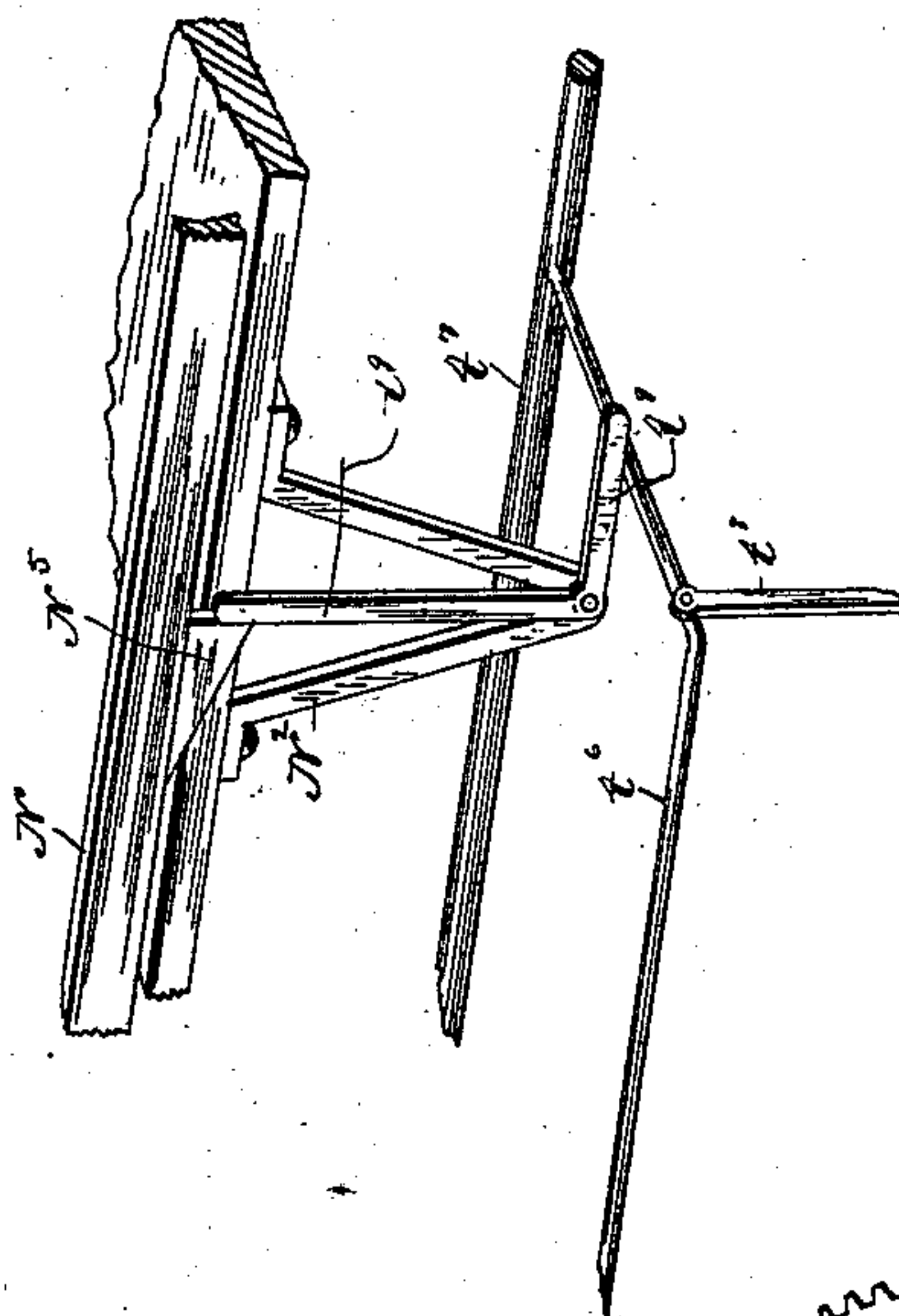


Fig. 16.

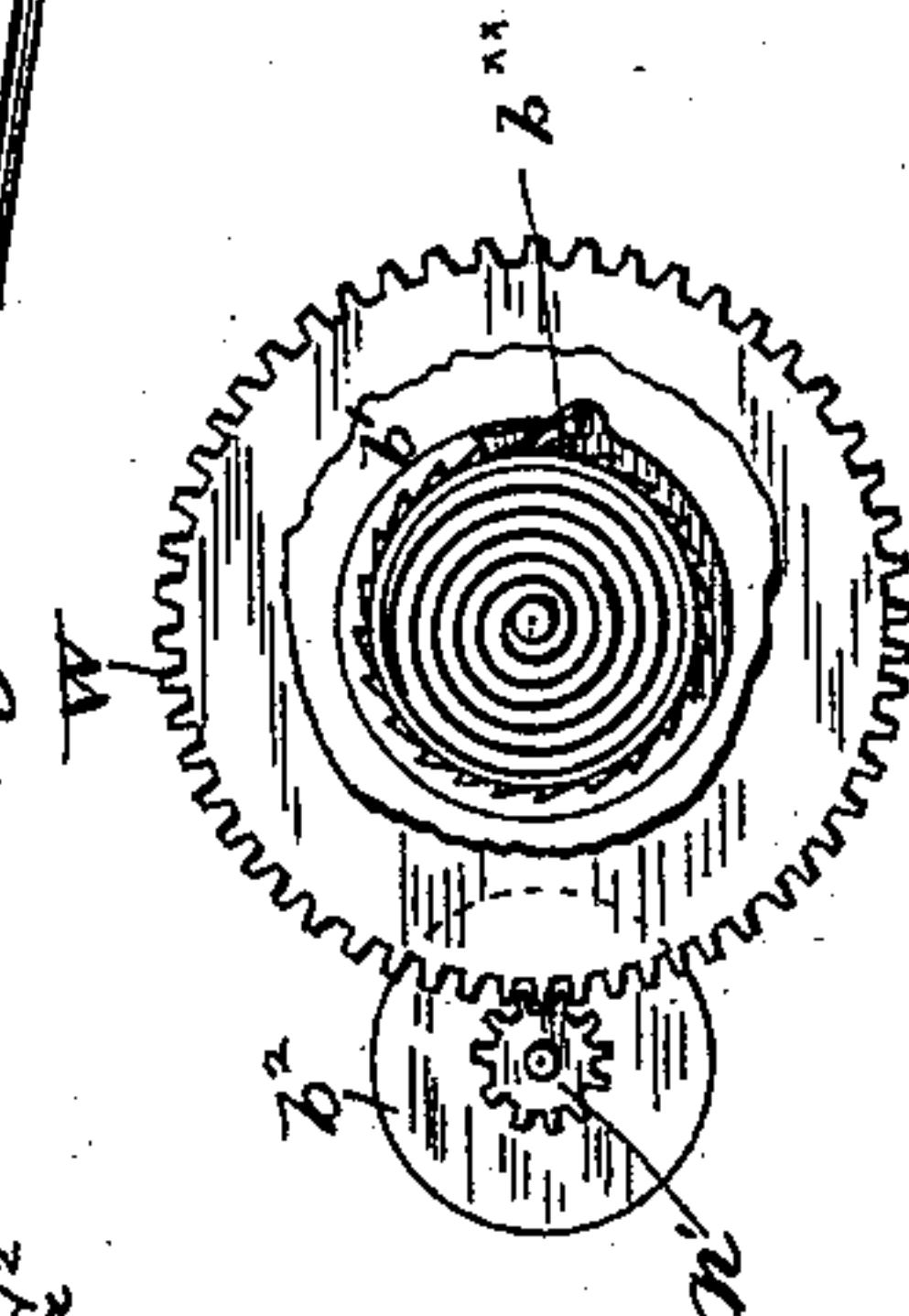


Fig. 12.

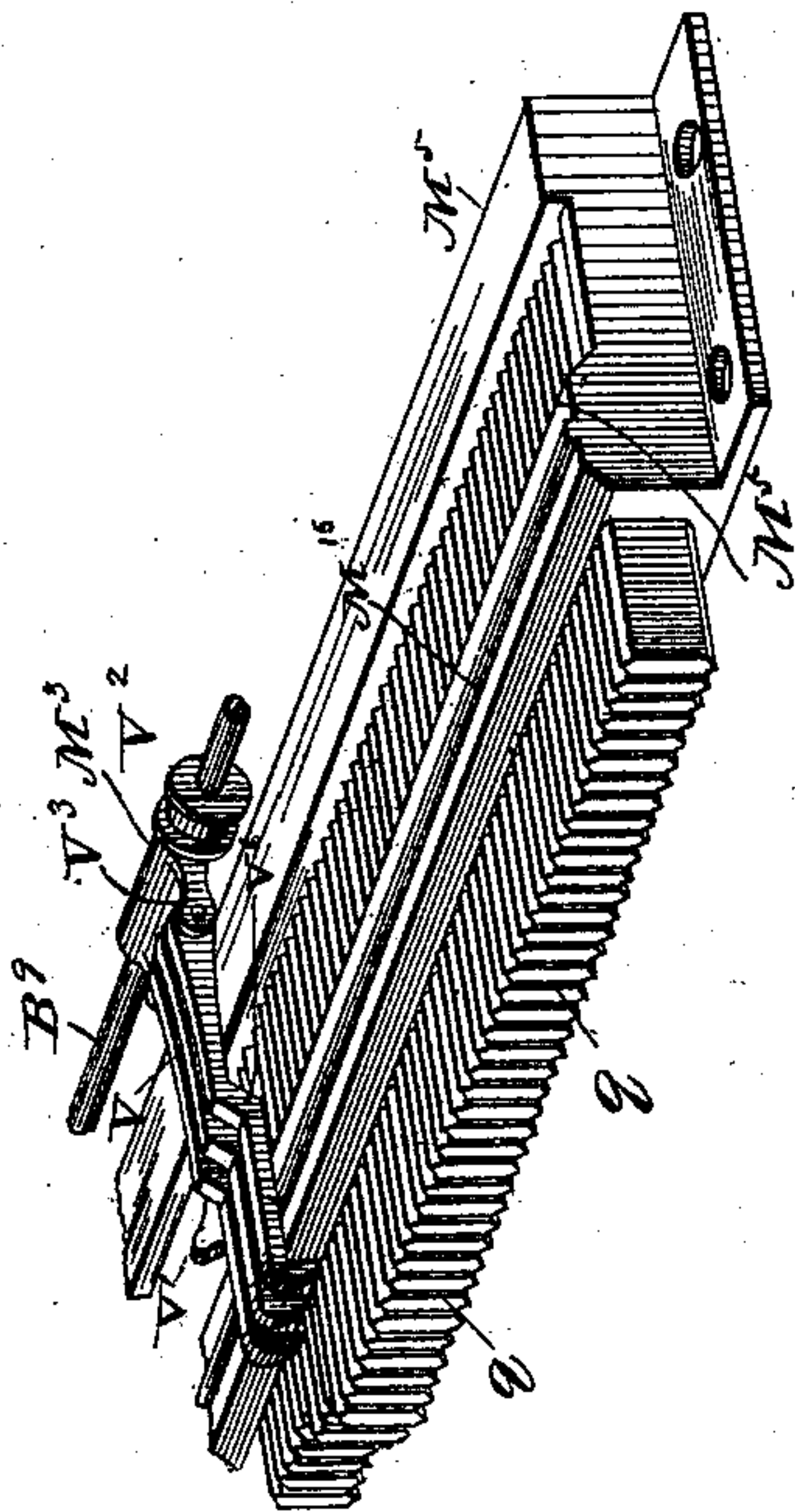
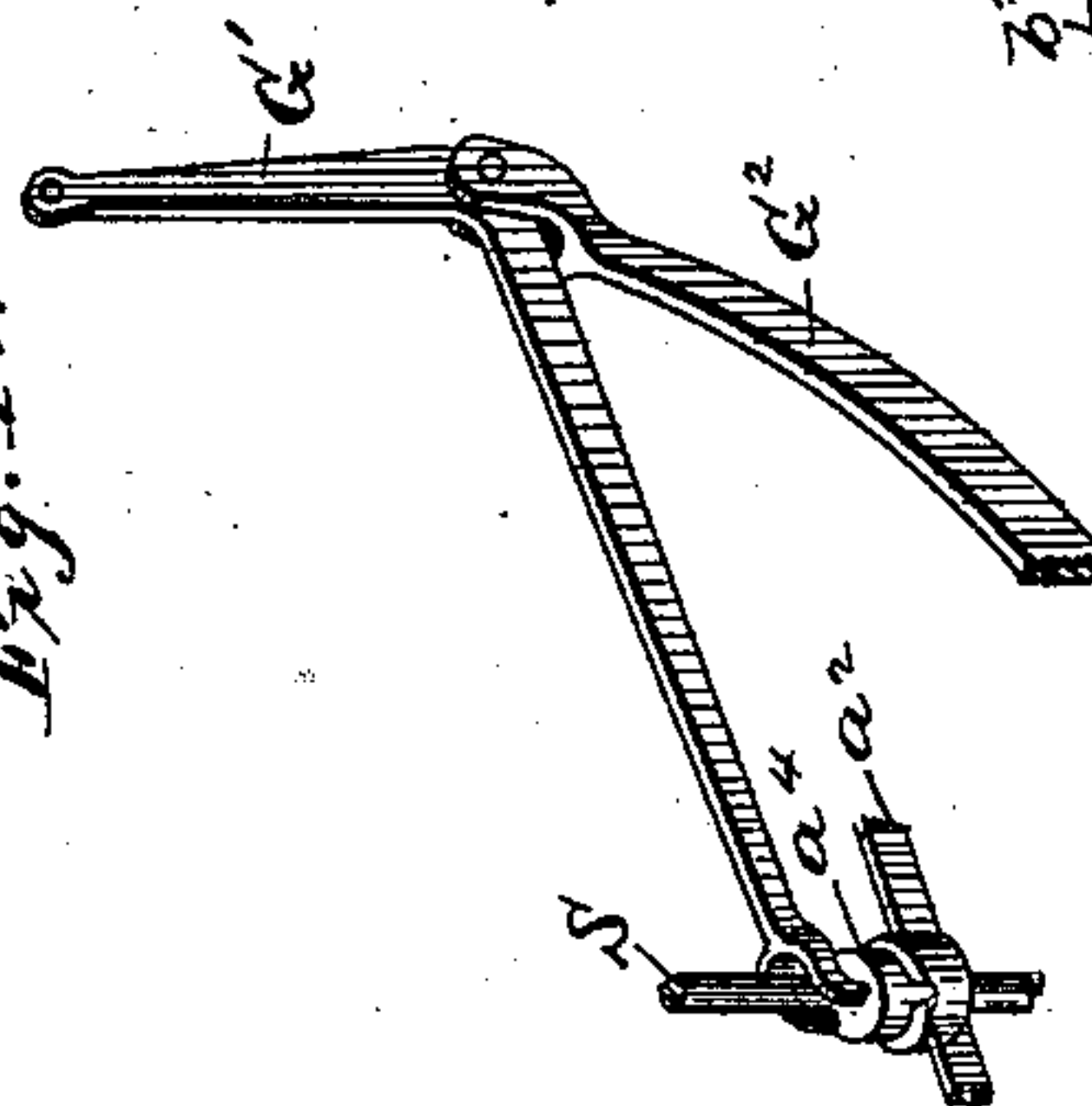


Fig. 24.



Witnesses.

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A. J. Stewart.

Inventor.

Chas. T. Moore

UNITED STATES PATENT OFFICE.

CHARLES T. MOORE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR
TO THE CAPITAL TYPE WRITING MACHINE COMPANY, OF VIRGINIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,523, dated November 12, 1895.

Application filed July 3, 1885. Serial No. 170,645. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. MOORE, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Methods of Printing and in Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

My invention relates to a method of printing, which consists in taking a blank sheet, selecting a character to be printed, bringing said character into juxtaposition with said sheet, selecting another character, printing the previously-selected character, and bringing the last character into juxtaposition with said sheet and moving the sheet laterally as the characters are selected and printed, and moving it longitudinally when a line has been printed, and to a method involving the selection of a character to be printed bringing said character into printing position, gaging the distance for feeding the paper corresponding to the width of the character brought to position, selecting the same or another character, printing the character previously selected, bringing the last character into juxtaposition with the sheet, executing the feed previously gaged, and gaging the length of of feed corresponding to the width of said last-designated character, and so on, to form words.

The invention also relates to mechanism hereinafter described by which the foregoing processes or methods may be conveniently practiced, and to that class of type-writing machines in which a rotatable type-wheel having on its face or periphery letters or characters from which to print is adapted to be arrested at the printing-point by the engagement with an arm upon its shaft of a pin projected from the face of a dial by the operation of a finger-key corresponding to the character desired to be printed. Heretofore in all machines of this class, so far as I am advised, the type-wheel has been so arranged with respect to the keyboard as that when a key was pressed by the operator the type-wheel was caused to rotate so as to

bring the character corresponding to the key to the printing-point and there make an impression, the whole operation being completed by the time the key depressed resumed its normal position, which it did upon the pressure of the finger being removed from it.

In my present machine, in order to carry out my new method of printing, I have introduced what I believe to be a new principle of operation, which is this: Instead of printing the character designated by the key depressed, as is usually the case, I print by the depression of such key the character designated by the depression of the last previous key operated upon and set the machine so that it will print in turn said last-designated character upon the designation of the one next succeeding it, by which I am enabled to secure greater uniformity in the printing and a higher rate of speed. I also so arrange my paper-feeding devices as to cause an advance of the paper proportioned to the width of the characters printed, and I preferably provide suitable contrivances for applying ordinary printing-ink to the type-wheel, thereby securing print which cannot be distinguished from that ordinarily produced by the printer with the usual appliances.

There are many other important principles involved in my machine which I will not at this point consider, deeming it more advisable to first describe the machine and its operation at length and then point out its several features of novelty in the claims at the close of this specification.

Referring to the accompanying drawings, Figure 1 is a plan view of the machine with the covering of the inking apparatus removed to show the ink distributing and applying rollers and with a portion of the bed broken away to show the devices for operating the distributing-roller. Fig. 2 is a vertical cross-section taken on the line *ww*, Fig. 1. Fig. 3 is a longitudinal vertical section taken on the line *zz*, Fig. 2. Fig. 4 is a section taken on the line *yy*, Fig. 2, the upper portion of the machine being removed. Fig. 5 is a section taken on the line *xx*, Fig. 2, the upper portion of the machine being removed. Fig. 6 is a detail view in plan of a portion of the paper-feeding mechanism. Fig. 7 is a per-

spective view of the paper-cylinder, showing a part of the framework of the paper-carriage and the line and paragraph feed. Fig. 8 is a detail view showing the feed-pawls and one of the quads or spaces of the feeding mechanism. Figs. 9 and 10 show perspective and edge views, respectively, of one of the dial-pins. Fig. 11 is a front view, partly in section, showing the locking-bar under the keyboard for securing the spacing-pins. Fig. 12 is a perspective view of the frame containing the spacing-quads and showing the position of the actuating-pawls; Fig. 13, a bottom plan view of the arms on the type-wheel shaft. Fig. 14 is a detail view showing the lever for actuating the presser-arm, which restores the dial-pins to their normal positions, together with a portion of said presser-arm, type-wheel shaft, and the arm constituting a fulcrum for said lever. Fig. 15 is a detail view showing a portion of the paper-carriage frame and mechanism for automatically effecting the line movement of the paper. Fig. 16 is a view of the means for winding the spring which rotates the type-wheel shaft by the backward movement of the paper-carriage.

Similar letters and figures of reference in the several figures indicate the same parts.

S represents the type-wheel shaft arranged vertically of the machine and supported in suitable bearings therein. Upon this shaft are loosely mounted two type-wheels E' E^2 , the same being connected by a common hub or sleeve A^x and prevented from independent rotation by rods d^2 , passing through them and secured to heads or collars d^3 d^3 , fixed to the shaft, as shown in Fig. 2. These type-wheels E' E^2 are provided on their peripheries with upper and lower case characters, respectively. The upper portion of the type-wheel shaft is made hollow to receive a rod or shaft I, and is slotted at S' to permit of the movement of a yoke I' , which passes through the said shaft I and is secured at opposite ends to the upper type-wheel E^2 . Connected to the shaft I at F^6 is the bent end L^2 of a vertical rod L' , which is guided at F^5 , A^2 , and T^3 , as shown in Fig. 2. Near the lower end this rod L' is provided with a pin T^4 and upon it below this pin is mounted a sleeve T' , to which is connected one arm of a toggle T T^2 , the other arm of said toggle being connected to the step or bearing T^3 . A rod L connects the toggle T T^2 to a frame B^2 , that extends from side to side of the machine beneath the keyboard and is capable of a slight lateral motion in guides H^3 H^3 , though it is normally kept pressed backward by means of springs H' H' . The lower arm of bell-crank levers B' , pivoted to the frame of the machine, is provided with a slot in which projects a pin on the frame B^2 , while the upper arm of said levers has bearing upon it a bar B, extending from side to side of the machine and secured to arms B^x , pivoted at 10, as shown in Fig. 2.

The frame B^2 is provided with two series of

spring-pins p^2 p^3 , the former or forward series p^2 occupying normally a position immediately beneath pins p' , projecting from the under side of the keys K of the keyboard. When the pins p^2 are thus beneath the pins p' , the frame B^2 is held pressed back to the limit of its movement by the springs H' and the connecting-rod L, the toggle T T^2 , the sleeve T' , rod L' , shaft I' , and the type-wheels carried by the latter occupying the position shown in Fig. 2, the upper type-wheel (which is the one on which the lower-case characters are arranged) standing opposite the presser-bar P of the paper-carriage and remaining there so long as the lower-case characters are desired to be printed. When, however, it is desired to print upper-case characters, the bar B in front of the keyboard is pressed, thereby causing the bell-crank levers B' to move forward the pin-frame B^2 and bring the series of pins p^3 beneath the pins p' , causing the connecting-bar L to straighten out the toggle-arms T T^2 and thereby through the sleeve T' and pin T^4 elevate the rod L' , and thus, through the intermediate connections before described, raise the type-wheel E' , bearing the upper-case characters to the printing-point opposite the presser-bar P.

Each time the rod L' is lifted, so as to bring the lower type-wheel bearing the upper-case characters in position for printing, a pin i upon said rod strikes and passes one arm of a pivoted bell-crank lever h , projecting in its path, after which said lever is returned to its first position by means of a spring h^4 and serves by supporting the said pin i to maintain said type-wheel in its adjusted position, where it remains until the next key is pressed, when said bell-crank lever h is thrown out of engagement with the pin i by the action of a pin-wheel h' , co-operating with its lower arm, and a rod g , bearing a pawl and acting upon a ratchet secured to said pin-wheel and itself actuated by a lever F' , attached to a bar F, extending from side to side of the machine beneath the finger-keys, as shown in Fig. 2.

The means for shifting and holding the type-wheels having now been described the means for imparting rotary movement to the type-wheel shaft and the type-wheels thereon and the devices for effecting the starting and stopping of the same, pursuant to the movements of the finger-keys, will be next considered. Mounted in fixed bearings A^4 A^5 and with the type-wheel shaft passing loosely through it is a barrel b^2 , containing a helical spring, which is secured at its inner end to the type-wheel shaft and at its outer end to said barrel b^2 . A pinion n' , formed upon or secured to said barrel b^2 , meshes with a larger gear-wheel W, fixed to a shaft S^3 . This shaft S^3 has a barrel b' loosely mounted upon it, containing a helical spring stronger than the spring within the barrel b^2 and secured at its inner end to the shaft S^3 and at its outer end to said barrel b' . Above the barrel b' and mounted upon a fixed sleeve S^2 , through

which the shaft S^3 passes, is still another barrel b , containing a spring having its outer end secured to said barrel b and its inner end to said fixed sleeve S^2 . Connection is made between the barrels b b' by means of a ratchet b^x , formed upon the upper portion of the barrel b' , and a pawl b^{xx} , mounted upon the barrel b and engaging said ratchet, as shown in Figs. 2 and 16, and connection is made between the barrel b and a reciprocating paper-carriage N by means of a rack-bar R , secured by arms R' to said carriage, (see Figs. 2 and 4,) and a pinion n , formed upon said barrel b and meshing into said rack-bar.

Each time the reciprocating paper-carriage is brought back to starting-point after having completed the movement in front of the type-wheel (which may be done by hand or by a foot-lever operating through a cord or chain C^5 , Fig. 3) the rack R , connected to it, operating through the pinion n , winds up the spring within the barrel b and the said barrel b , operating in turn through the pawl-and-ratchet connection b^{xx} b^x before referred to, causes the spring within the barrel b' to be also wound up and to operate through shaft S^3 , wheel W , and pinion n' to turn the barrel b^2 and wind up the spring contained within it that acts directly upon the type-wheel shaft S . From this arrangement it will be seen that the type-wheel shaft and the type-wheels thereon are propelled by the spring in barrel b^2 , which spring is kept constantly wound by the action of the spring in the barrel b' , and, further, that the last-named spring and the spring in the barrel b are, by reason of the pawl-and-ratchet connection between their respective barrels, wound up simultaneously whenever the paper-carriage is brought back to starting-point by the action of the operator's hand or foot, though in unwinding they are entirely independent in their operation and perform their separate functions without interference.

It will be understood that by reason of the series of springs b^2 , b' , and b , arranged and operating as described, the type-wheels will be given their impulse and be caused to revolve by the action of the spring b^2 , which is applied directly to the type-wheel shaft. The movement of the type-wheels, therefore, is more prompt and uniform than would be the case were the power applied indirectly through the medium of a fusee. Another advantage is that the light spring applied directly to the shaft does not acquire such momentum as would be the case with a train of gearing, and therefore shocks and strains from such source are avoided.

It will of course be understood that the spring in b is relied upon to feed the paper-carriage forward whenever a stop in front of said carriage is released.

The lower end of the type-wheel shaft passes centrally into and has a bearing in a circular dial D . This dial has arranged around it a series of pins e , as many in num-

ber as there are keys to the keyboard and characters upon either of the type-wheels. Each of these pins is provided with a slot E^x in its outer edge, into which projects a shoulder e^{xx} from the body of the dial, the object of which construction is to enable the pin to have a limited sliding motion vertically. Each pin is further provided with a beveled upper end and with a shoulder e^2 , as shown in Figs. 9 and 10. Immediately beneath each of the pins of the dial is arranged the bent end k of a lever K^2 , pivoted at 3 to a suitable fulcrum or support upon a fixed cross-bar A^2 . These levers K^2 are arranged in the manner shown in Fig. 5, and each one is adapted to be actuated from one of the keys K of the keyboard by means of a pin p , as shown in Fig. 2. When any one of the keys K is depressed, the pin p depresses one end of the lever K^2 beneath it and throws up the other bent end k of said lever and causes it to force upward the appropriate dial-pin above it, as shown in Fig. 2, while upon pressure being removed from the key the lever K^2 will drop back to its normal position.

Loosely mounted upon the type-wheel shaft is an arm a , the free end of which is adapted to engage with the shoulder e^2 of one or the other of the dial-pins e when the latter is elevated. Above this loosely-mounted arm a is another arm a' , rigidly secured to the shaft and having interposed between it and the swinging arm a a light yielding spring a^{xx} , as shown in Fig. 13.

A vertically-swinging arm a^2 , pivoted by a horizontal pivot to a short extension of the arm a , is formed with or connected to a sleeve or collar a^{xxx} , which encircles the type-wheel shaft, and above this collar is a sleeve a^4 , loosely mounted on the shaft and bearing upon the collar a^{xxx} and having in turn bearing upon it the end of the lower arm of a bell-crank lever G' , pivoted to a fixed support G^2 . (Shown in Figs. 2 and 14.) The upper arm of the bell-crank lever G' is connected by a link J to a rod G , that extends from side to side of the machine and is supported in vibratory arms F^2 , pivoted at 5 to a bracket or hanger on the frame, as shown in Fig. 2. Each of the arms F^2 , near its lower end, is provided with a cam-groove f^2 , in which works a pin on the end of a lever F' , which is pivoted at 2 to the framework and is connected at its opposite end by a bar F , extending transversely of the keyboard and beneath it to a similar lever on the opposite side of the machine.

One of the pins e of the dial is always in an elevated position with the free end of the swinging arm a against its shoulder e^2 , being held there by the tension of the spring applied to the type-wheel shaft. The free end of the vertically-swinging arm a^2 normally stands just above the upper end of said raised pin. It is essential that one of the pins should thus be at all times elevated in order to arrest the type-wheel shaft and prevent the

springs which operate upon it from running down.

It is remarked that the combination of rotatable type-wheel, finger-keys, stops for arresting the type-wheel, and intermediate mechanism operated by the keys for actuating the stops is such that the key struck for designating a given character will immediately resume its normal position and yet leave the stop in its operative position to arrest the movement of the type-wheel and that the same key may be used in succession to redesignate or repeat the same character as often as may be desired. Assuming, then, one of the pins to be elevated and the type-wheel shaft arrested, if one of the keys of the keyboard is depressed the dial-pin corresponding to said key will be raised through the instrumentality of the end k of the lever K^2 , while at the same time the arm F^2 by the action of the pin 4 on the lever F' in the angular portion of its cam-groove f' will be vibrated, thus causing the bell-crank lever G' to be rocked first forward and then backward, the forward motion causing the vertically-swinging arm a^2 to bear down upon the upper end of the previously-elevated pin and to depress said pin. Before, however, the said pin has been sufficiently depressed to release the swinging arm a from its shoulder e^2 the ends m^x of two arms $m' m'$, secured to the sleeve a^4 , pass in between teeth of a locking-wheel E , secured to the type-wheel shaft, (shown in Figs. 2 and 3,) and prevent the shaft from rotating; but as soon as the pin has been depressed sufficiently far to release the said swinging arm a from the shoulder e^2 the spring a^{xx} operates to throw said arm a past the shoulder e^2 to an extent, however, limited by a stop a^5 on the arm a' . Upon the backward motion of the bell-crank lever G' referred to the vertically-swinging arm a^2 is thrown upward by the operation of a spring A^7 , (shown in Fig. 2,) carrying with it the sleeve a^4 and effecting the release of the locking-wheel E from the hooked ends m^x of the arms $m' m'$, thereby permitting the type-wheel shaft to rotate until the arm a strikes the shoulder e^2 of the pin last elevated, this operation being repeated each time a finger-key is depressed.

It should here be stated that the pins of the dial have such relation to the characters on the type-wheel as that when any given pin is raised from the dial by the operation of its corresponding finger-key and caused to arrest the swinging arm a of the type-wheel shaft the character on the type-wheel corresponding to the key and to the pin so raised will be brought to the printing-point and stand ready to make an impression upon the paper when the next key is depressed and the next pin elevated, as described.

The paper-carriage N is provided with friction-rollers $R^2 R^5$ and is adapted to travel back and forth in front of the type-wheels upon guide-rails $R^3 R^4$, with which said rollers engage.

The presser-bar P to which reference has hereinbefore been made, is provided at opposite ends with arms P^2 , which have bearings in the paper-carriage and permit of said presser-bar being reciprocated back and forth transversely of the paper-carriage toward and from the type-wheel by the operation of the vibrating arms F^2 through the shaft G and swinging arms F^3 hung at F^4 to brackets in the paper-carriage and connected near their middle at N^2 to the arms of said presser-bar, as clearly indicated in Fig. 2. A paper-rest P' is pivoted to the arms P^2 of the presser-bar and its lower edge is curved so as to fit the under portion of the presser-bar, a spring P^3 being employed to keep said edge up to the presser-bar with yielding pressure.

The paper on which the impression is to be made is passed between the paper-rest P' and the presser-bar P , thence over the front of said presser-bar, and thence over a large paper-cylinder C , its margins being held between said cylinder and two small friction-rolls $c' c'$, as shown in Figs. 1, 2, and 3. The feeding of the paper is effected by the rotation of the paper-cylinder C . On the end of said cylinder C is secured a ratchet-wheel t , with which is adapted to engage a spring-pawl t' , mounted upon an arm t^2 , pivoted at t^3 to the paper-carriage N , and actuated by a rod t^5 , which is in a slotted arm t^1 , secured to the paper-carriage N . The lower end of the rod t^5 is provided with an eye or opening in its lower end, through which passes a crank-arm t^6 , projecting from an oscillating shaft t^7 . Motion is communicated to said shaft t^7 and to the pawls connected thereto through a rod t^8 , connected to a finger-key Q , all as shown in Figs. 4 and 7. After each line has been printed upon the paper the finger-key Q may be depressed, thereby causing the paper-cylinder C to be rotated by the described connections sufficiently to advance the paper, so as to bring it in position to receive the impression of the next line. It will be noted that the crank-arm t^6 extends from side to side of the machine and that although the rod t^5 slides back and forth with the paper-carriage its connection with said crank-arm t^6 is preserved and that therefore a depression of the line-key Q will have the effect of shifting the paper in position for receiving the impression of the next line, regardless of the point at which the previous line terminates.

Instead of operating the paper-cylinder-rotating mechanism by hand, through the key Q , it is generally operated automatically by means of a bell-crank lever t^9 , pivoted to a depending bracket N^2 , secured to a stationary part of the frame, and a stop N^5 , secured to the paper-carriage and adapted upon the return movement of said carriage to strike the upper arm of said bell-crank lever t^9 and cause the lower arm thereof to operate upon the crank-arm t^6 , as shown in Fig. 15.

The means for advancing the paper-car

riage and the paper thereon after each letter is printed in the direction of the length of the line a distance corresponding to the width of said letter will next be described.

5 M^5 , Figs. 1, 6, and 12, represents a frame secured to the upper portion of the machine and at the left thereof, as shown in Figs. 1 and 3. Within this frame are arranged a series of sliding bars or what may be termed
10 "quads." These quads are formed with reference to the width of the type on the type-wheel, one of them corresponding to the width of the narrowest type, two of them to the width of type of next size, and three of them to the
15 width of the largest type; and the function which they perform in the machine is to cause, after an impression has been made from a given type, the paper-carriage and the paper thereon to advance a distance equal to the
20 width of said type and bring it in position for receiving at the proper point the impression of the next type. The thickness of these quads may vary and two or more be employed to represent the smallest type and a relatively-
25 larger number for the largest type.

V V V represent three pawls of different lengths having hooked outer ends and pivoted at their inner ends to arms V^3 of a sleeve M^3 , which is mounted so as to slide freely upon a
30 rod B^9 . Each of these pawls is adapted to engage with one of the sliding quads q , and to prevent the possibility of more than one quad being caught at a time the quads are preferably tapered at their upper and lower edges.
35 This tapering of the edges of the quads also reduces the area of frictional surface of their sides.

V' is another and shorter pawl pivoted to a rearwardly-extended arm V^4 of the said sleeve
40 M^3 and having a pin or projection V^5 at its outer end, as shown in Fig. 6. Each of the quads q is further provided with a notch or shoulder V^2 on its upper edge near its middle, with which the pin or projection of the short
45 pawl V' is adapted to engage, as will be presently explained. The shaft B^9 , carrying the sleeve M^3 , is adapted to be reciprocated back and forth transversely of its length upon
50 guides $M M'$ by means of rods $B^7 B^7$, mounted upon the upper arms of bell-crank levers $B^6 B^6$, pivoted to a cross-shaft B^{11} , the lower arms of said bell-crank levers being connected by
55 rods B^5 to levers B^4 at 5 and connected by a bar B^3 , arranged beneath the pin-frame B^2 , as shown in Fig. 2.

M^2 is a metal piece or bracket arranged at one end of the paper-carriage N , as shown in Figs. 1 and 6, and having pins $C^4 C^5$, which
60 pass through corresponding guide-perforations in the carriage-frame N , and having also a short stud C^3 , adapted to project in the plane of the quads q when the latter are projected, and a long arm M^8 , which rests within a groove
65 in the sleeve M^3 and bears at its extremity the roller M^4 . Upon the pin C^5 is arranged a spiral spring, which bears at one end against a collar c^x on said rod and a lug c^y secured to the

carriage-frame, as shown in Fig. 6. The tendency of this spring is to throw the piece or bracket M^2 out, away from the paper-carriage
70 frame N , so that its projection C^3 shall be in advance of a projection N' , formed on said paper-carriage and likewise projecting into the plane of the quads when the latter are thrown outward.
75

Referring now to Fig. 2, it will be seen that whenever a finger-key is depressed for the designation of a letter its pin p' will depress the
80 spring-pins p^2 or p^3 , as the case may be, beneath it, and said pin p^2 or p^3 will in turn depress the bar B^3 and cause the rod B^9 to be pushed forward through the medium of the
85 bars B^4 , rod B^5 , bell-crank levers B^6 , and rods B^7 . In thus moving forward the bar B^9 will carry with it the sleeve M^3 , thereby causing the hooked ends of one or more of the pawls
90 V V V to engage with the end of the quad or quads beneath them, accordingly as more or less motion is given the bar B^3 . Then upon the finger-key being released the said pawl or
95 pawls V will be drawn backward, carrying with them one or more of the quads out of the path of the projection C^3 of the piece or bracket M^2 on the paper-carriage, but not out of the
100 path of the projection N' of the paper-carriage, since the latter projects farther than the projection C^3 . As soon as the end of the quad or quads is withdrawn from the projection C^3 , a
105 shoulder V^6 on each of the pawls by which the withdrawal of said quads is effected strikes a rib or bar M^{15} on the frame M^5 , and the said
110 pawls are disengaged from the quads and at the same time the pin on the spring C^5 operates to force the piece or bracket M^2 out from and in advance of the paper-carriage and
115 causes said projection to engage with the end of the quad next following the quad or quads withdrawn. If the letter designated is of the minimum width, the depression of the key will
120 cause one of the shortest spring-pins in the frame B^2 to act upon the bar B^3 and thus give the minimum amount of forward movement to the pawls V V V and cause the longest only of
125 said pawls to engage with and retract a quad, while the designation of a wider letter will cause a pin in the pin-bar made correspondingly longer to throw two or even three of
130 the pawls V into engagement, so as to retract two or three of the quads.

The three pawls V are made of different
120 lengths to correspond to the pins of different lengths in the pin-frame B^2 , and whenever a key is depressed to designate a letter of any
125 one of the three widths one or all of the pawls operate to withdraw partially a number of quads corresponding in aggregate thickness to the width of the letter designated. I state
130 that said quads are partially withdrawn, by which I mean that they are withdrawn far enough to be moved out of the path of the projection C^3 , but not sufficiently far to withdraw them from the path of the projection N' , the latter still remaining in engagement with them.

Bearing in mind that according to my process and in this machine, the printing of a letter does not take place when said letter is designated, but only upon the designation of the next succeeding letter, it will be obvious that the means for gaging or regulating the length of the feed of the carriage corresponding to the width of said letter must be adjusted upon the designation of said letter and in a manner to become operative after the letter is actually printed. By the partial withdrawal of the quads in the manner above indicated this adjustment of said means is effected. It remains now to be seen how this feed adjustment is practically applied. After the quads have been partially withdrawn or set up, so to speak, upon the designation of a letter and the next letter is designated the pressure of the key corresponding to said next letter causes all the pawls V and the pawl V' to be advanced, the former operating to engage with the appropriate number of quads, while the pin V^5 of the latter rides along the upper surface of the quad or quads set up by the previous operation, and then upon the pressure being removed from the finger-key all the pawls are retracted, the longer ones partially withdrawing or setting up the quads for the letter last designated, while the pin V^5 of the short pawl V' falls into the notch or notches V^2 of the quads partially withdrawn or set up by the previous operation, and, becoming thus engaged with said last-mentioned quads, operates to fully retract them and carry them out of the path of the projection N' of the paper-carriage, thereby permitting the paper-carriage to be advanced or fed forward under the influence of the helical springs within the drums b until the projection N' comes in contact with the quads last set up, the extent of such feed of the carriage being equal to the thickness of the quads thus completely withdrawn.

Upon the bar B^3 , through which the motion of the vertically-moving spring-pins p^2 is communicated to the lever B^4 , I may arrange an angular plate f , having a slight longitudinal back-and-forth movement on said bar B^3 , being actuated in one direction by a stop f^2 upon the frame and in the other by a spring f^3 , secured at one end to the frame and at the other to said plate f . This plate f is provided with a series of openings p^8 in its upper portion, which normally stand directly beneath and in line with the spring-pins p^2 of the bar B^2 and when any one of said spring-pins is depressed its lower end passes into one of these openings and bears against the bar B^3 , thereby causing the latter to descend. As soon as the bar B^3 begins to move downward the end of the plate f strikes the stop f^2 and causes said plate to be shifted against the tension of the spring f^3 and the edge of its opening to enter a groove in the side of the pin, as shown in Fig. 11, thus securely holding the pin connected to the bar B^3 until the

finger-key rises, when its disconnection will be automatically effected by the spring f^3 , as will be readily understood. The advantage of employing this locking-plate is that it absolutely limits the stroke of the bar B^3 to the length of the depressed pin between its head and the frame B^2 and prevents the jumping of the bar when the keys are struck with unusual force.

The mechanism for inking the type-wheels is as follows: Referring to Figs. 1 and 3, r^{10} represents a hollow cylinder divided into a lower and an upper compartment by a partition r^{15} , and r^{14} is another smaller cylinder arranged alongside the first named and adjacent to the type-wheels. Centrally of the cylinder r^{10} is arranged a shaft r^3 , which has secured to it near its upper end an arm r^2 , bearing at its outer end a roller r' , which is adapted when the said shaft r^3 is rotated to revolve around in contact with the inner periphery of the cylinder r^{10} and to come back into contact with an inking-roller r , mounted on an arm u pivoted at u' to the casing A , which incloses the type-wheels. Ordinary printers' ink is applied to the inner surface of the cylinder r^{10} , and the roller r' operates to evenly distribute it and to transfer it to the roller r , which applies it to the type-wheels. Mounted loosely upon the shaft r^3 , near the lower end thereof, is a ratchet-wheel r^5 , to which is secured a barrel r^4 , containing a helical spring, which is connected at one end to said barrel and at the other end to said shaft r^3 . A pawl r^7 , mounted upon a reciprocating bar r^8 , is adapted to engage with the ratchet-wheel r^5 and wind up the spring within the barrel r^4 , while another pawl r^6 serves to prevent backward rotation of the barrel when said spring is wound. Motion is imparted to the bar r^8 by a crank-arm r^{16} , secured to the shaft B^{11} , to which the bell-crank levers B^6 are also secured, as before described. (See Fig. 2.) Also secured to the shaft r^3 is a fixed arm r^{13} , which normally is in contact with a swinging tripping-lever or catch r^{12} , (shown in Fig. 3,) being held in engagement therewith by the stress of the spring applied to the shaft. The lower end of this tripping-lever stands normally in the path of a cam or projection r^9 on the barrel r^4 . The operation of these parts is as follows: Each time the shaft B^{11} is oscillated, as the result of the depression and release of a finger-key, the bar r^8 through its pawl r^7 , acting upon the ratchet r^5 , causes the barrel r^4 to be rotated the distance of one tooth and the spring within it to be correspondingly wound up, and by the time the barrel has made one complete revolution the spring is completely wound up and the cam r^9 is brought to the point where it strikes the tripping-lever r^{12} and vibrates it, so as to release the arm r^{13} , whereupon the shaft r^3 is permitted to make one complete revolution, or until again arrested by the re-engagement of the rod r^{13} with the tripping-lever, and during

such rotation the distributing-roller r' passes once around the inner periphery of the inking-cylinder r^{10} and back to contact with the inking-roller r . Since the type-wheels are required to be shifted up and down for the printing of upper and lower case characters, provision has to be made for the withdrawal of the inking-roller r from contact with them during such shifting operation. I therefore form in the shifting-rod L' (see Fig. 2) two V-shaped notches $O O$ and cause the shorter end of the arm u , which bears said inking-roller r , to normally bear against the said rod L' . When either type-wheel is in printing position, the said arm u will be entered in one or the other of the notches $O O$ and the inking-roller will be permitted to bear against the periphery of such type-wheel; but whenever said rod L' is shifted, for the purpose of changing the position of said type-wheels, the said arm u will ride out of the notch and swing sufficiently to remove the inking-roller from contact with the type-wheel, and remain out of contact until the shifting operation is completed, when the next notch is brought into position.

At the end of each use of the machine, or, in other words, the completion of the printing of the particular matter being transcribed, the operator to print the last letter designated strikes the space-key of the keyboard, which causes the corresponding pin of the dial and the corresponding space quad or quads to be set up. Then the driving of the paper-carriage back to position to begin a new line of matter, whether done then or at the next use of the machine, effects through the roller M^4 the automatic restoration of said quad or quads to their normal positions and adjusts the machine so that upon the depression of the first key at the beginning of the new line the paper-carriage will not be advanced at all, but will remain stationary until the second letter is designated. Suppose it is desired to write the word "The" at the beginning of a line. The operation will be as follows: The operator will first press upon the bar B , which will cause the frame B^2 to be advanced, so as to bring the appropriate pin p^3 beneath the spring-pin p' of the key used for designating "T," and cause the rod L' to be lifted, so as to bring the lower type-wheel into printing position in front of the presser-bar P . Then, while the said bar B still remains down, he will depress with his other hand the key representing "T," which will cause the bent end of the appropriate lever K^2 to project from the dial the corresponding dial-pin, the lever F' to operate upon the swinging lever F^2 , and cause, first, the presser-bar to make a dead-stroke toward the type-wheel; secondly, the vertically-swinging arm a^2 to depress the dial-pin representing the space on the type-wheel and disengage from said pin the laterally-swinging arm a , and, thirdly, the ends m^x of the arms m' to en-

gage with the teeth of the locking-wheel E and hold the type-wheels and type-wheel shaft firmly from rotation and cause the bar B^3 to be depressed, so as to effect through the intervening devices the engagement of the appropriate number or quads by the three pawls $V V V$. All this takes place upon the depression of the key used to designate "T." When, then, the said key is released and permitted to rise, the bar B^3 will resume its normal position, and in so doing will cause the three pawls $V V V$ to withdraw the appropriate number of quads from the path of the projection C^3 and permit the piece or bracket M^2 to advance until said projection C^3 strikes the next quad in its path. The single pawl V' on this first stroke will perform no function, but will be left ready to act at the next stroke upon the quads just set up. The pin 4 on the end of lever F' in passing through the upper portion of cam f' will cause the lever F^2 to recede and remove the presser-bar P , with the paper, from contact with the type-wheel, and at the same time through the rod G and link J raise the end of bell-crank lever G' from off sleeve a^4 , thus allowing the ends m^x of the rods m' to be receded or disengaged from locking-wheel M , and thus permit the type-wheels and shaft to rotate till the arm a engages with the shoulder e^2 of the dial-pin just set up by the designation of the letter "T," this operation bringing the letter "T" on the lower type-wheel to the printing-point, and the key K^2 will also fall back to normal position. When the next letter "h" is designated, the preceding letter "T" will be printed, the paper-carriage advanced by the withdrawal of the quads from in front of the projection N' a distance corresponding to the width of the letter "T" just printed, and the letter "h" on the upper wheel will be brought to the printing-point, and so in like manner will the designation and printing of the letter "e" take place.

In the example just given it will be noted that before the designation of the letter "T" the bar B is required to be depressed in order to bring the lower printing-wheel bearing the capital or upper-case letters to the printing-point. In this operation the pin i on the shifting-rod L' passes above the arm of the bell-crank lever h , and upon the pressure being removed from the bar B the said pin i will rest upon the arm of the bell-crank lever h , and thus hold the rod L' and connected parts elevated. Of course the pressure should not be removed from the bar B until after the key designating the letter "T" is struck.

When the letter "h" is designated by the striking of its appropriate key, the movement of the lever F' consequent thereon will through the rod g' cause the pin-wheel h' to be rotated and the bell-crank lever h to be vibrated, thereby releasing the pin i and permitting the rod L' and its connections to de-

scend. Such release of the rod L' of course takes place in point of time after the impression has been made of the letter "T."

It will of course be understood that during the operation of designating and printing just described the ink distributing and applying devices will be worked in the manner hereinbefore described.

When the paper-carriage has advanced to its fullest extent, (which will be at the completion of a line,) it can be returned to starting-point either by hand or by the operation of a foot-treadle, and as the result of its return the springs for actuating it, as well as the springs which serve to impart motion to the type-wheel shaft, will be wound up, as before described. As a further result of the return of the carriage the wheel M⁴ on the end of the arm M³ will operate upon the quads retracted during the printing of the last line and cause them to be projected again in normal position.

The advance of the paper for the printing of the next line is effected by the mechanism described, either automatically or by hand, as before mentioned.

I claim as my invention—

1. The herein described method of producing printed matter, which consists in selecting the type or dies representing the characters to be imprinted, severally bringing said type or dies as they are positioned to a state of rest, taking an impression from the positioned type or die while selecting the one representing the succeeding character, and arranging the resultant matter in a series of parallel lines, as set forth.

2. The herein described method of producing printed matter, which consists in severally selecting the type or dies representing the characters, positioning said type or dies as selected, taking an impression from the positioned type or die while in a state of rest, removing the type or die from position after the impression has been taken while positioning the type or die representing the next character, advancing the imprinted character a space corresponding to its width, and arranging the resultant matter in page form, as set forth.

3. The herein described process of producing printed sheets, which consists in selecting the type or dies severally, positioning the same as selected, taking the impression therefrom while in a state of rest, removing them from position while bringing the last selected type or die into position, inking the type or die while moving to and from position, and dividing the resultant matter into a series of parallel lines in which each character in a word occupies a space corresponding to its width, as set forth.

4. As an improvement in the art of producing printed sheets, selecting the several type or dies by one operation for each, taking an impression from each type or die as selected

while in a state of rest by a second operation, and dividing the resultant matter into a series of parallel lines by a separate operation for each line, as set forth.

5. As an improvement in the art of printing, bringing the upper case carrier into line with the press by one operation, selecting, and positioning a type or die by another operation, imprinting the letter or character represented by the type or die on the upper case carrier by mechanism actuated while selecting and positioning a type or die representing a letter or character upon the lower case carrier, as set forth.

6. As an improvement in the art of printing, first positioning a type or die representing an upper case character, bringing the type or die to rest, and taking an impression from the same while selecting a type or die representing a lower case character, as set forth.

7. As an improvement in the art of printing, type carriers provided with dies representing different characters, means for bringing a die on one carrier into printing position, and means for taking an impression of the positioned die by mechanism actuated by the instrumentalities employed in selecting and positioning a die representing a character, blank or space on another carrier, substantially as set forth.

8. In a type-writing machine, the combination of a series of quads normally obstructing the travel of the paper-carriage, with means for withdrawing said quads singly and in series from the line of obstruction so that a variable letter-space movement may be imparted to said carriage, substantially as set forth.

9. In a type-writing machine, a series of quads normally obstructing the travel of the paper-carriage, means for withdrawing said quads from the line of obstruction singly or in series according to the width of the letter or character imprinted, and means for restoring said quads to their normal position upon the return of the paper-carriage after a line has been formed, substantially as set forth.

10. In a type-writing machine, a series of quads normally obstructing the travel of the paper-carriage, means upon the selecting of a letter or character to automatically position said quads in number corresponding to the width of the letter or character selected, to be withdrawn from the line of obstruction, and means to withdraw the number positioned by a second operation, as set forth.

11. In a type-writing machine, a series of quads normally obstructing the travel of the paper-carriage, means for automatically positioning a number thereof to be withdrawn from the line of obstruction by one operation, means for withdrawing the number positioned by another operation, and means to position a number to be withdrawn by the next operation, substantially as set forth.

12. As a means for varying the letter-space movement of the paper-carriage in a type-writing machine, a number of laterally arranged quads, the series occupying a space equal in length to that of the line to be printed, the several quads having a thickness corresponding to the equal units into which each letter or character may be divided, substantially as set forth.

13. The dial having arranged therein the sliding pins corresponding to the characters on the type-wheels, each of said pins having the shoulder and beveled upper end as described, in combination with the type-wheel shaft and its type-wheels, the laterally swinging arm on said type-wheel shaft adapted to engage with the shoulders of the setting pins the fixed arm and its spring for acting on said laterally swinging arm and the vertically swinging arm for depressing the dial pins, substantially as described.

14. The combination of the hollow slotted type-wheel shaft, the shaft working within the same, the type-wheels and the yoke passing through the inner shaft and connected to the type-wheel, substantially as described.

15. The combination with the type-wheel shaft and the type-wheels mounted thereon, of the sliding shaft with which said type-wheels are connected, the shifting rod connected to said last-mentioned shaft, the toggle and means substantially as described for operating the toggle.

16. The combination with the rod by which the type-wheels are shifted and the pin or projection upon said rod with the bell-crank lever for engaging the said pin and the pin wheel actuated as described for disengaging said lever and permitting the rod to drop when a finger key is depressed, substantially as described.

17. The combination of a type-wheel shaft, a driving spring attached directly to said shaft, and a supplemental motor for keeping the primary spring under tension, substantially as described.

18. The combination of a paper carriage a type-wheel shaft, a spring directly attached to said shaft, and supplemental springs for keeping the primary spring under tension and for operating the paper carriage, substantially as described.

19. The combination of the type-wheel shaft and type-wheels thereon, the paper carriage, the series of springs and connections substantially such as described between said shaft and carriage, whereby upon the backward movement of the carriage all said springs are wound up and motive power provided for the type-wheel shaft and carriage, substantially as described.

20. The combination of the type-wheels, the laterally movable frame the movable projections therein of different heights and intermediate connections for shifting the type-

wheels as the frame is changed laterally, substantially as described.

21. The combination of the type-wheels, the laterally movable frame carrying projections of different heights or lengths, intermediate connections for shifting the type-wheels upon the lateral movement of the frame, the bar B^3 , the reciprocating pawls operated by said bar and the sliding quads operated by said pawls, substantially as described.

22. The combination of the type-wheels, the laterally movable frame having two series of pins, intermediate connections for shifting the type-wheels, a bar B^3 , reciprocating pawls, the sliding quads, a paper carriage and devices substantially as described, interposed between the bar and paper carriage for regulating the forward movement of said carriage, substantially as described.

23. The combination with the sliding quads, the series of pawls of different lengths for engaging said quads, the bar B^3 , and devices substantially such as described, for communicating the motion of the latter to the pawls, of the pins of different lengths mounted in the pin frame and the keys for depressing said pins, whereby one or more of the pawls will be caused to engage a corresponding number of the quads according as a short or longer pin is depressed.

24. The combination with the keys of the key board of the pin frame carrying the pins, the bar at the front of the key board for designating upper case characters and operating through intervening mechanism, substantially such as described said pin frame, the vertical rod for shifting the type-wheels, the toggle and the rod connecting the toggle with the pin frame, substantially as described.

25. The combination of the type-wheels, the laterally movable pin frame having the two series of pins and means substantially as described for causing the type-wheels to shift as the position of the pin frame is changed laterally, with the bar upon which the pins operate, the reciprocating pawls actuated by the movement of said last-mentioned bar, the sliding quads, the paper carriage and the adjustable bracket thereon, substantially as described.

26. The combination with the pins of the pin frame and the bar upon which said pins operate, and means substantially such as described for automatically locking the pins to said last mentioned bar when they are depressed and unlocking the same when they are raised, substantially as described.

27. The combination with the pins of the pin frame, of the bar upon which the pins act, the longitudinally movable plate upon said bar having the openings for receiving the ends of the pins, and means, substantially as described for locking and unlocking said plate to and from the pins, substantially as described.

28. The combination with the paper cylinder mounted upon the paper carriage and having a ratchet on its end, of the pawl for operating upon said ratchet, of the pivoted arm upon which said pawl is mounted, the rod connected to said arm having the perforation or eye at its lower end, the crank arm secured to the oscillating shaft and means, substantially such as described for moving said arm, substantially as described.

29. The combination with the presser bar having a motion transversely of the paper carriage with the pivoted paper support moving with said presser bar and the paper cylinder mounted upon the paper carriage substantially as described.

30. The combination with the presser bar having motion transversely of the paper carriage, of the pivoted paper support held against the presser bar by spring pressure, substantially as described.

31. The combination with the type-wheels, of the paper carriage bearing the paper holding and feeding cylinder, the presser bar mounted upon said sliding carriage and having a motion to and from the type-wheel, the swinging arm connected at its upper end to a stationary bracket on the carriage, to the presser bar and the vibrating lever provided with a cam slot and actuated by a lever which is in turn operated upon by the finger key, substantially as described.

32. The combination, in a type-writing machine, of a type-wheel, ink roller and a spring for propelling the same with mechanism for winding the spring, substantially as described.

33. The combination with the inking cylinder, of the arm rotating therein carrying the ink distributing roller the type wheel and the roller for applying the ink to the type-wheels, mounted upon the swinging arm or lever, substantially as described.

34. The combination with the shaft of the inking mechanism, of the arm secured thereto carrying the distributing roller, the roller the inking cylinder for applying the ink transferred to it to the type-wheel and mechanism substantially such as described for causing a periodic rotation of the ink shaft so as to cause the distributing roller to revolve around and in contact with the inner periphery of the inking cylinder and arrest it when it again arrives in contact with the said ink applying roller, substantially as described.

35. The combination with the shaft of the inking mechanism, of the arm secured thereto carrying a distributing roller the inking cylinder a roller for applying the ink transferred to it to the type-wheel and mechanism substantially as described for causing a periodic rotation of the inker shaft.

36. The combination of the shaft of the inking mechanism, the inking cylinder the arm carrying the distributing roller, the other

arm for engaging the tripping lever, the barrel and its cam and ratchet and inclosed helical spring and the mechanism substantially such as described for advancing the ratchet to wind up the spring, substantially as described.

37. The combination with the type-wheels and the rod by which they are shifted, of the inking roller and the pivoted arm upon which it is mounted the outer end of said arm bearing against the shifting rod and engaging with depressions or notches therein, substantially as described and for the purpose specified.

38. In a type-writing machine, the combination of a printing surface, an inking apparatus for said surface, a spring for propelling said inking apparatus, mechanism for winding the spring, a stop for arresting the forward movement of the distributing roller and a trip for periodically releasing said roller, substantially as described.

39. The combination of the paper carriage, the bracket mounted thereon, having the short projection or stop, the sliding quads, the series of pawls of different lengths and the individual short pawl, with bar M¹⁵ and means substantially such as described for reciprocating said pawls across the said bar, the series of setting pins of different lengths and the finger keys, substantially as described.

40. In a type-writing machine, in which upon the designation of a given character by the striking of a key the character precedently designated by the striking of the key last struck will be printed, the combination with the type-wheel and a paper carriage movable in front of the type-wheel, of a series of quads or stops for arresting the paper carriage, each quad being as to thickness a divisor of the width of each character on the type-wheel and mechanism, substantially as described, for withdrawing upon the striking of a key a number of quads corresponding to the width of the character printed, as set forth.

41. The combination of a paper carriage having a stop and a bracket mounted upon and movable with relation to the paper carriage and also having a stop, with the movable spacing quads, substantially as described.

42. The sliding quads made beveled or tapering at their upper edges, in combination with the pawls for retracting them, substantially as described.

43. The combination with the sliding quads of the pawls and the rib on the quad frame for automatically disengaging said pawls from the quads, substantially as described.

44. The combination with the sliding quads, of the series of pawls of different lengths for engaging the ends of said quads, the sleeve to which said pawls are pivoted and the laterally reciprocating rod upon which said sleeve is mounted, substantially as described.

45. The combination with the movable pa-

per carriage, of the adjustable bracket mounted thereon the quads the stop adapted to engage with the quads and a spring operating to project said bracket in advance of said carriage, substantially as described.

46. The combination of a series of feed quads, pawls for starting said quads to designate a proper feed and a pawl for operating the

previously started quads to permit the execution of the feed, substantially as described. 10

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES T. MOORE.

Witnesses:

THEODORE LANG,
C. H. MOORE.