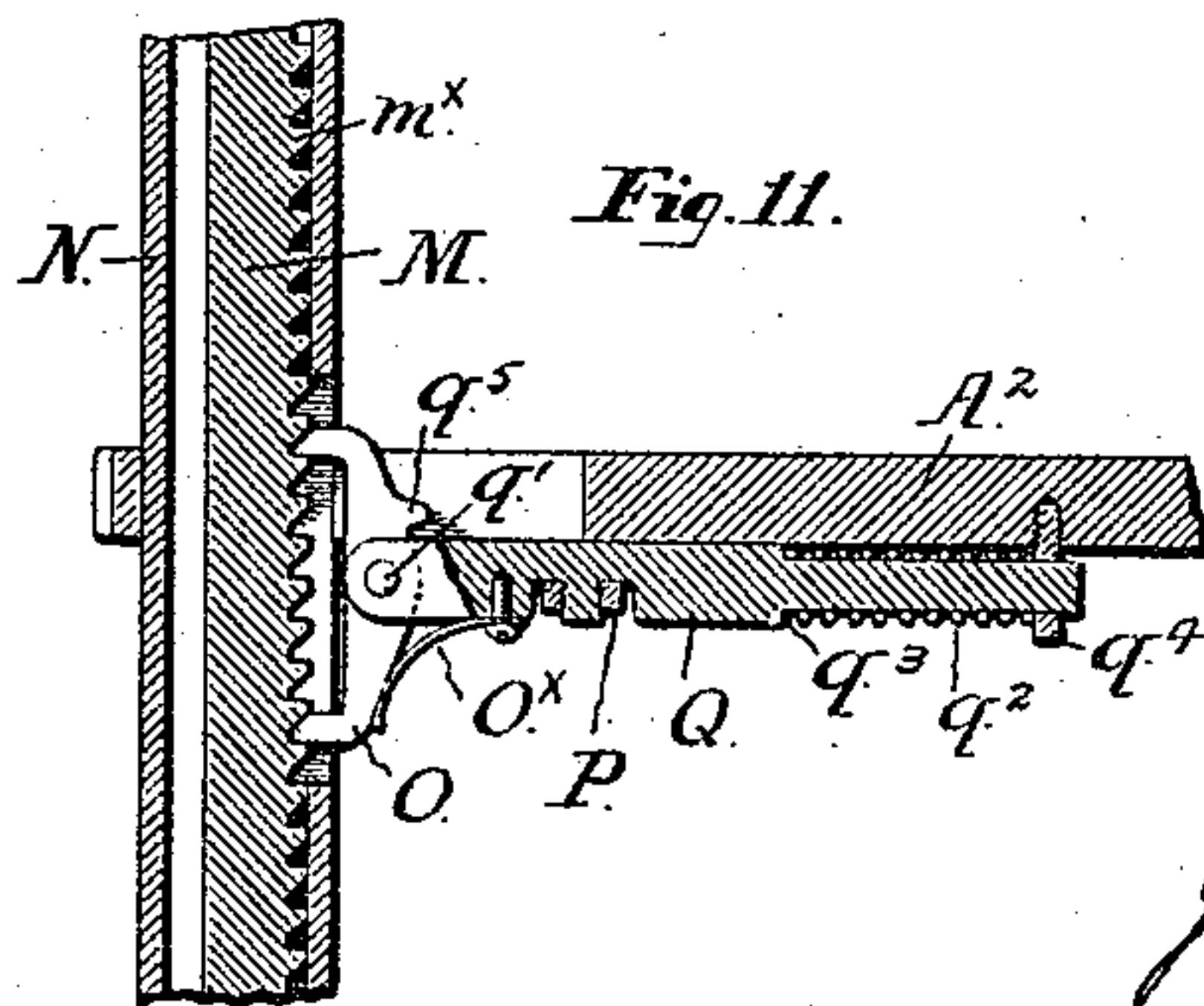




J. W. SCHUCKERS.  
TYPE WRITING MACHINE.

No. 441,257.

Patented Nov. 25, 1890.



Witnesses:

John F. Bradley  
Attest

Inventor

Jacob W. Schuckel



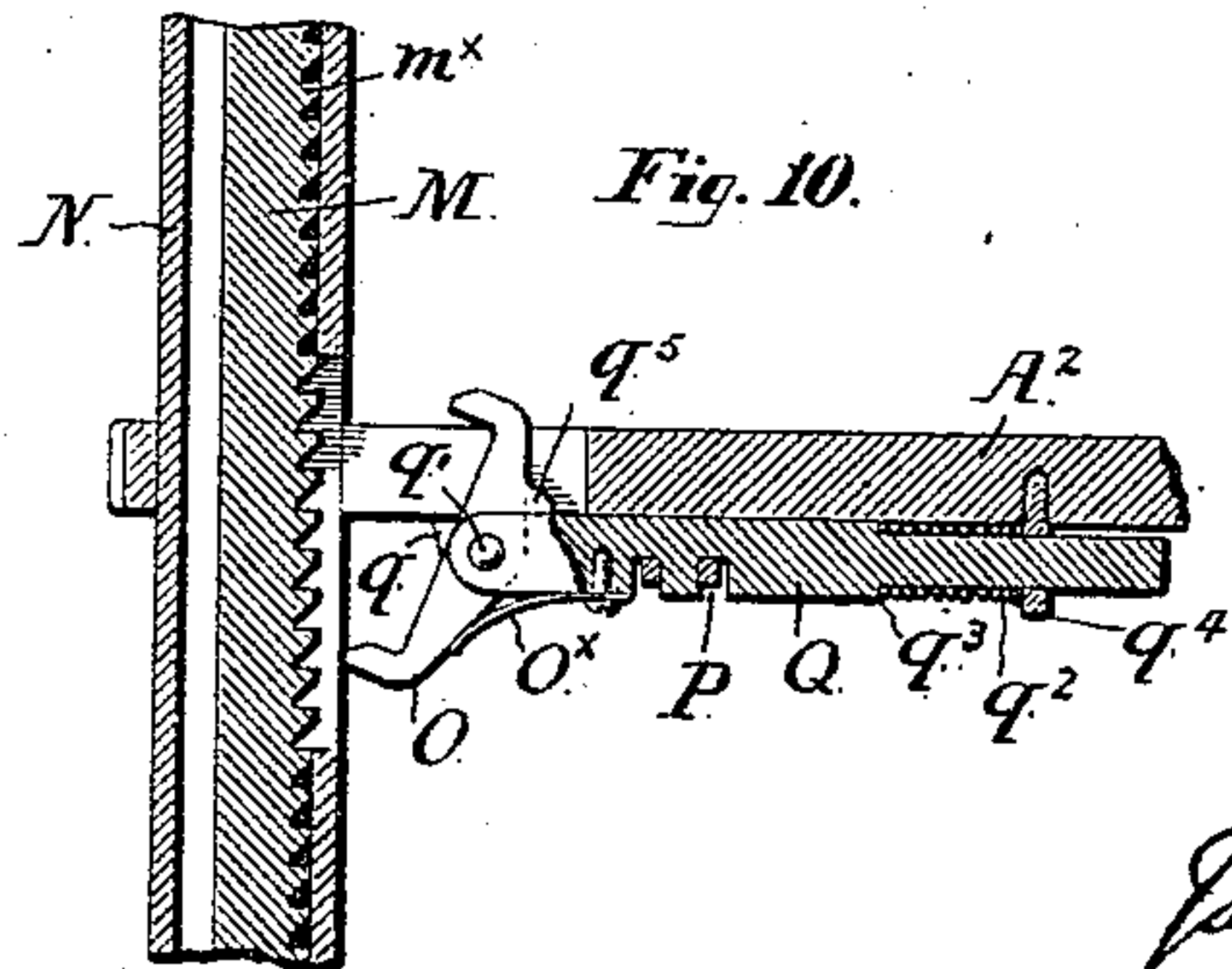
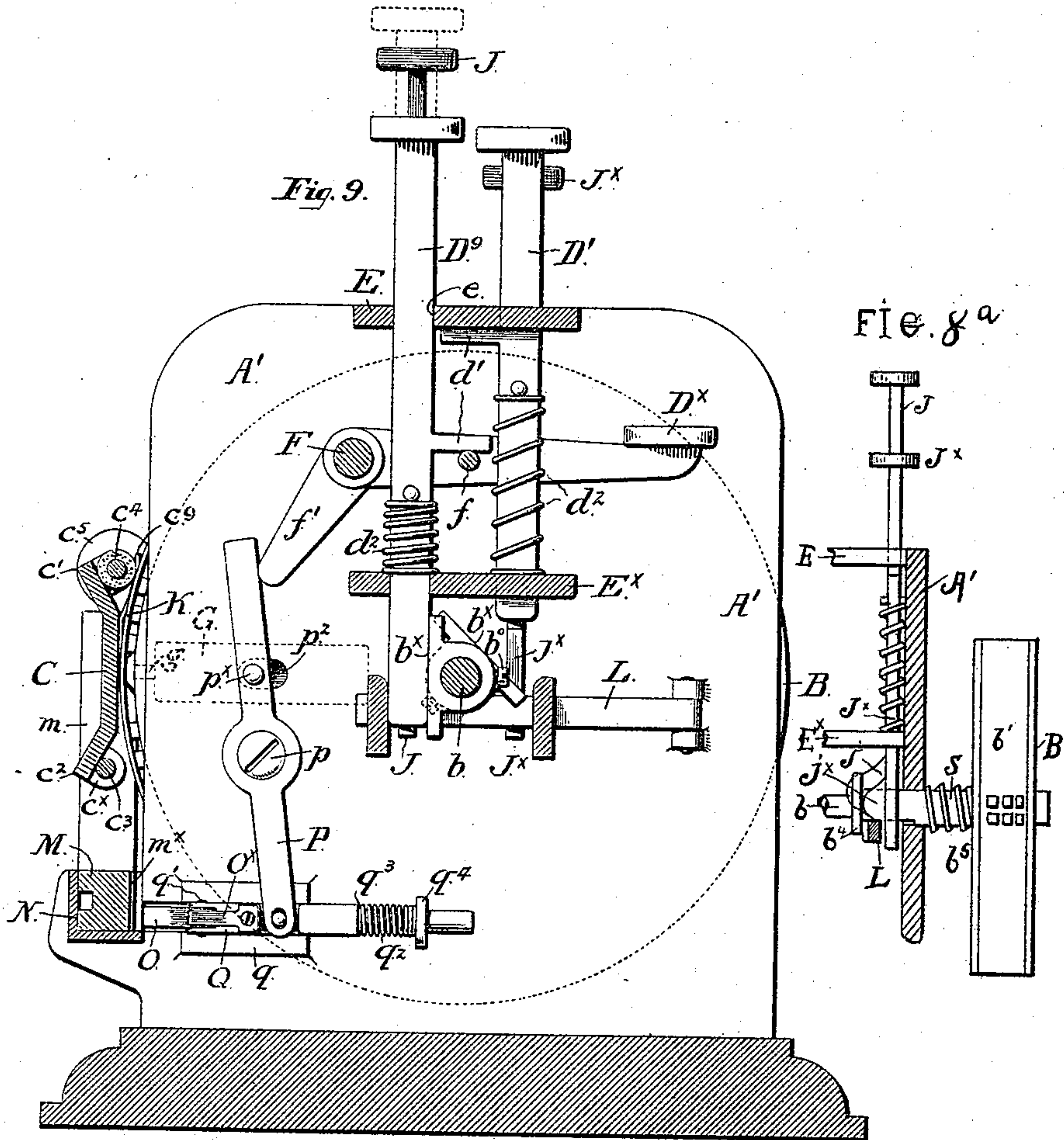
(No Model.)

J. W. SCHUCKERS.  
TYPE WRITING MACHINE.

5 Sheets—Sheet 3.

No. 441,257.

Patented Nov. 25, 1890.



Witnesses:

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*Ed. Horner*

Inventor

*James W. Schuckers*

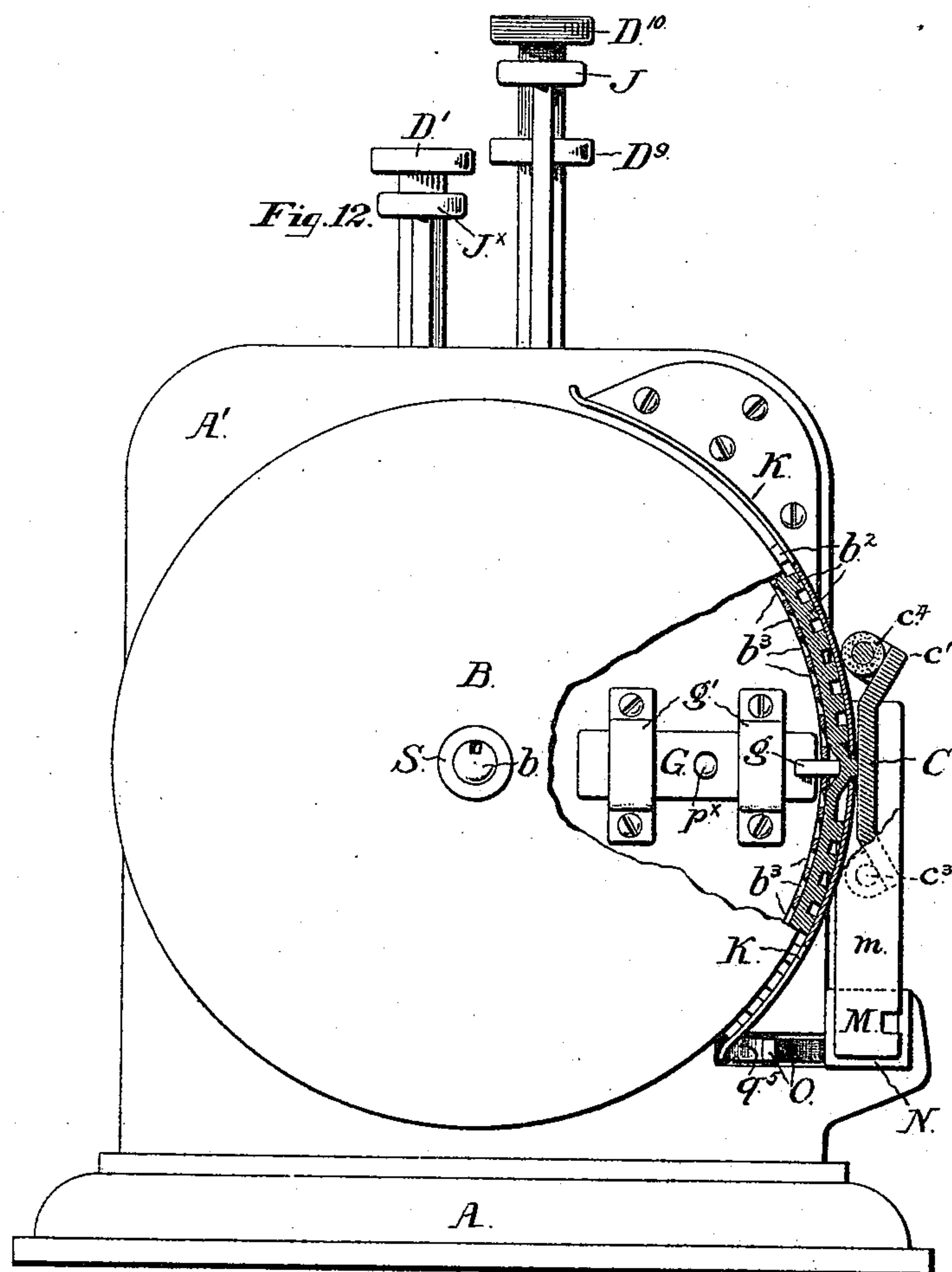
(No Model.)

5 Sheets—Sheet 4.

J. W. SCHUCKERS.  
TYPE WRITING MACHINE.

No. 441,257.

Patented Nov. 25, 1890.



Witnesses:

*John J. Bradley*  
*W. H. H. H.*

Inventor

*Jacob W. Schuckers*

(No Model.)

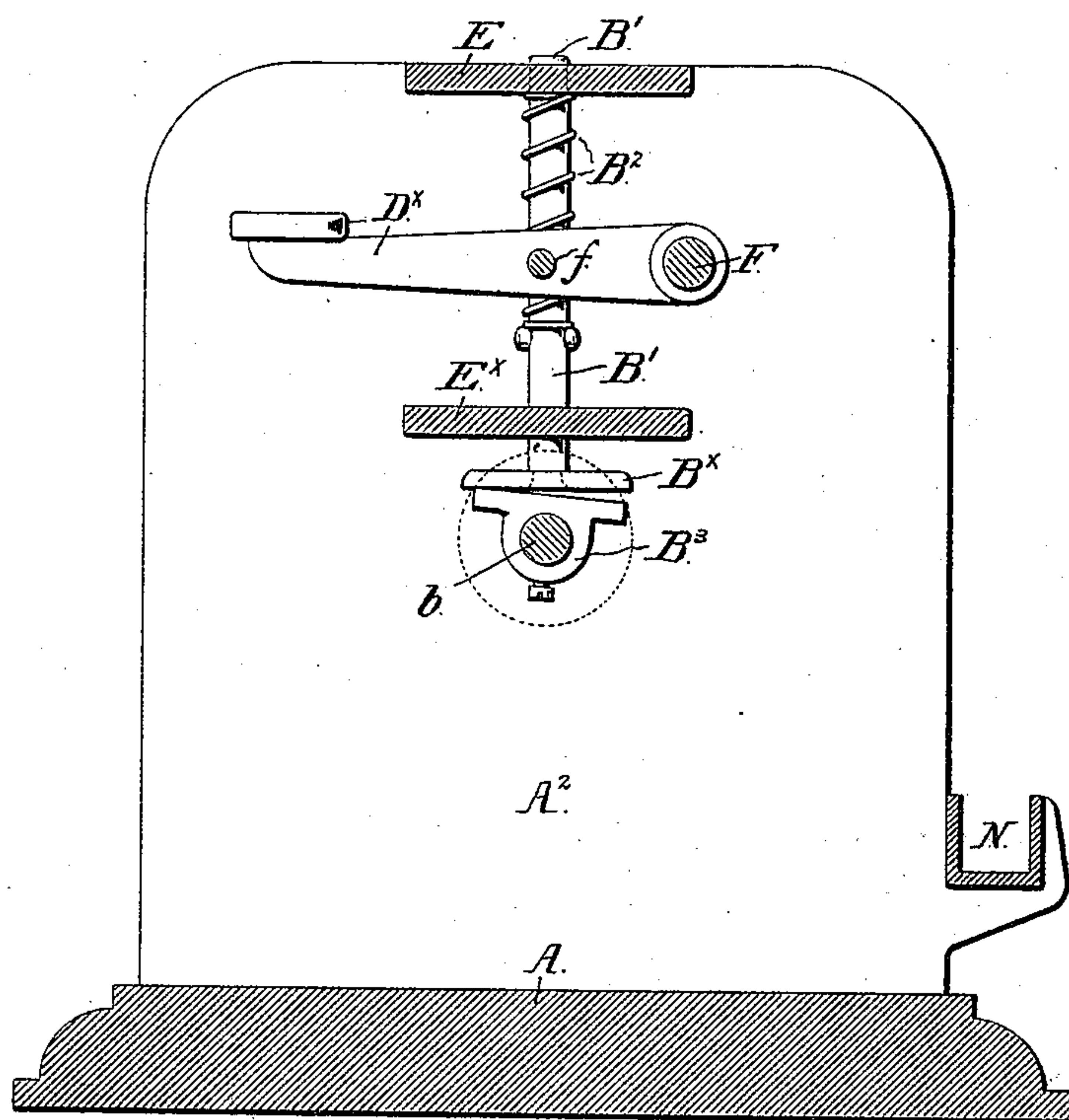
5 Sheets—Sheet 5.

J. W. SCHUCKERS.  
TYPE WRITING MACHINE.

No. 441,257.

Patented Nov. 25, 1890.

*Fig. 13.*



Witnesses:

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*James W. Schuckers*



# UNITED STATES PATENT OFFICE.

JACOBS W. SCHUCKERS, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE  
ESSEX TYPEWRITER COMPANY, OF WEST VIRGINIA.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 441,257, dated November 25, 1890.

Application filed July 2, 1889. Serial No. 316,308. (No model.)

*To all whom it may concern:*

Be it known that I, JACOBS W. SCHUCKERS, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The object of my invention is the production of an inexpensive, simple, and durable type-writing machine; and to such end my invention comprehends certain improved devices and combinations of devices, which together constitute an organized machine of novel character, a good form of a convenient embodiment of which is represented in the accompanying drawings and hereinafter described, the particular subject-matter claimed as novel being hereinafter definitely specified.

The machine shown as embodying my invention was designed as an improvement upon the type-writing machines shown in my application, Serial No. 310,393, filed May 11, 1889; and the invention consists in part of improvements upon that machine, the present machine being simpler, especially in that the keys themselves constitute the deflecting travelers and operate directly upon the shaft, and this feature I claim independently of any special manner in which the keys engage the position-plates upon the shaft during the rotating and locking movement. The shaft deflecting and locking operation of the present machine, however, is essentially different from that of my prior application. The position-plate in the present case is moved into parallelism with the engaging surface of the key when the type-wheel shaft is rotated to the desired position, and during the further impression movement of the key the position-plate is in engagement therewith and parallel thereto, so that the shaft and type-wheel are thus locked in position during the impression movement. This construction and operation of the shaft and member by which the shaft is operated are evidently applicable to other forms of machines than that shown in my prior application and in the present case, and this construction forms a part of my invention independently of the special form of ma-

chine to which it is applied, and whether the key or some part operated thereby engages the position-plate.

In the drawings, Figure 1 is a top plan view of a machine embodying my invention. Fig. 2 is a front elevational view of the platen and its tension and feed rollers removed from the platen-carrier. Fig. 3 is a similar view of the platen-carrier removed from its ways. Fig. 4 is a right-hand end elevational view of the platen as shown in Fig. 3. Fig. 5 is a side elevational view of one of the position-plates removed from the shaft. Fig. 6 is a face elevational view of said plate. Fig. 7 is a fragmentary perspective detail of a portion of the wheel-shaft, together with a portion of its series of separate or independent position-plates which correspond in number with the number of the keys, and each of which plates is fixed to said shaft and the face of each of which is a plane, but which are all set at different angles. Fig. 8 is a transverse sectional elevational view of the machine represented in Fig. 1 in the plane of the dotted line  $x x$  upon said figure, and sight being taken in the direction of the arrows upon said lines, the views showing the normal position of rest of the parts represented. Fig. 8<sup>a</sup> is a detail of the shift-ing-keys. Fig. 9 is a view similar to Fig. 8, except that instead of showing the position of rest of all parts represented it shows the position of such parts after the depression of a key, the consequent deflection of the wheel-shaft, and the advance of the hammer. Figs. 10 and 11 are fragmentary sectional plans in a central horizontal plane through the pawl-carrier, base-bar of the platen-carrier, and carrier-way, especially illustrative of the rack-and-pawl connection between the platen-carrier and the pawl-carrier. In Fig. 10 there is illustrated the position of the pawl before its action to advance the platen-carrier, and in Fig. 11 its position at the time of its completion of such advance. Fig. 12 is a right-hand end elevational view of the machine of Fig. 1, a portion of the type-wheel and platen-carrier being broken away to exhibit the application of the types of the rim of the type-wheel, which rim, as well as a portion of the platen, is shown in section, and to exhibit also the ham-



mer-slide. Fig. 13 is a transverse sectional elevational view especially illustrative of the shaft-returning plate and the devices by which it is mounted and operates.

5 Similar letters of reference indicate corresponding parts.

The frame-work of the machine is conveniently composed of a bed or base plate A, from which are erected two parallel transverse end  
10 frame-plates A' A<sup>2</sup>, being standards, which serve to support the entire mechanism of the machine. The left-hand frame-plate A<sup>2</sup> in the construction shown is preferably located at the extreme left-hand end of the bed or  
15 base plate A, and the right-hand frame-plate A' about midway between the center and the right-hand end of said base-plate. The frame-plates, which are preferably counterpart, are preferably also cast webs, of the form shown  
20 in Fig. 13, screwed or otherwise suitably connected with the base-plate.

The two end frame-plates and the base-plate in conjunction with certain transverse-ly-extending rails, hereinafter referred to,  
25 preferably constitute the entire frame-work of the machine, which, as will be apparent, is exceedingly simple and inexpensive.

The types *b*<sup>2</sup> of the machine are arranged in circumferential series upon and preferably  
30 project from the periphery of a type-wheel B, to which movement of partial rotation in either direction is imparted, in order to bring a particular type in front of a platen C disposed in approximate tangency to said type-  
35 wheel. The type-wheel is, in a manner herein-after described, mounted conveniently, but not necessarily, to the right side of the right end frame-plate A' upon the projecting ex-  
40 tremity of a shaft, which I term the "wheel-shaft" *b*, which extends longitudinally of the machine in a horizontal plane, and has its bearings in the two frame-plates, through both of which it passes. It is obvious that rotary  
45 movement imparted to the wheel-shaft will likewise be imparted to the type-wheel, which is fixed thereon to rotate therewith, and that according to the extent and direction of the  
50 said rotary movement of the shaft will be the movement of the wheel.

The organization so far as described is essentially that of my former machine. The move-  
55 ment of the shaft and wheel is, however, in this machine directly controlled by the movement of the keys, of which any suitable series is employed, and all of which serve to impart a movement to said shaft and wheel. The keys are arranged in two parallel rows, banks, or tiers, of which those in the front  
60 row are designated by the letters D' to D<sup>8</sup>, inclusive, while those in the back row are designated by the letters D<sup>9</sup> to D<sup>16</sup>, inclusive. It is to be understood that I have in the accompanying drawings represented but eight keys in each tier simply for the sake of clearer  
65 illustration, and that any desired number of such keys may in each tier be employed. As the keys of both tiers are alike, a description

of one will be sufficient. Selecting, then, key D', (shown in Figs. 8 and 9,) the key consists  
70 of a flat vertically-disposed bar, to which the letter D' is applied, which is a blank of metal of the form shown in the drawings surmounted by a finger-knob, the upper face or pressing-  
75 surface of which is provided with a letter, number, or other character correspondent to the type which said key controls, and which is mounted for vertical movement in slots, ways,  
80 or bearings *e*, formed, respectively, in an upper and a lower key-rail E E<sup>x</sup>, which respectively extend in parallel horizontal planes between the frame-plates of the frame-work,  
85 with which plates their outer ends are respectively connected. The key-rails are conveniently flat bars or plates of metal pierced at stated intervals by openings, being the  
90 ways or bearings *e* for the keys, and which are connected with the frame-plates in any preferred manner. All of the keys of each tier are essential counterparts, their front and  
95 back edges being straight and parallel with each other in order not only to secure their accurate mounting with respect to their bearings, but also their accurate action with respect to their respective position-plates, as  
100 hereinafter set forth. Each key is formed or provided with a projecting lug, which I term the "key-lug" *d'*, and it should be remarked that the lugs of the keys of the front tier project from the back edges of said keys, while  
105 those of the keys of the rear tier project from the front edges of said keys, and which serves by abutting beneath the upper key-rail to limit the upward traverse of the key-action occasioned by the expanding stress of a spiral or other suitable lifting-spring, which I  
110 term the "key-spring" *d*<sup>2</sup>, which encircles the key, and which is interposed between the upper face of the lower key-rail, and a stop *d*<sup>3</sup>, formed upon or applied to the key. The key-lug serves, also, in the last part of the down-  
115 ward thrust of traverse of the key to encounter and depress a horizontally-extending bail *f*, common to the lugs of the keys of both tiers, and operative in connection with and spring-  
120 ing from a horizontally-extending hammer rock-shaft F, journaled in the frame-plates, the outer right-hand extremity of which shaft is equipped with a rocker-toe *f'*, which imparts the striking impetus to the hammer-slide G, as  
125 hereinafter explained. The bail *f* is conveniently formed as a stiff wire running between the tiers of keys in parallelism with the hammer rock-shaft and sprung from said shaft by being at its extremities connected with two le-  
130 vers, which I term the "spacing-keys" D<sup>x</sup>, Figs. 8, 9, and 13, which at their inner extremities are fixedly connected with the hammer rock-shaft, and the depression of either of which occasions an oscillation of said hammer rock-shaft similar to that occasioned by the de-  
pression of the bail under the contact with it of any one of the key-lugs. The depression of any key occasioning the depression of the rocker-rod, and the forward rotation of the



rock-shaft, will consequently occasion the lift of the rocker-toe  $f'$ , which projects backwardly from near one end of said shaft.

It being the office of a key when depressed to occasion, as stated, a given rotation of the wheel-shaft and type-wheel, that rotation is accomplished, not, as in my former machine, through the intervention of a traveler, but by the direct contact of an edge of said key, and preferably an edge of that portion thereof which in the downward movement of the key projects beneath the lower key-rail with a position-plate upon the wheel-shaft adjusted as to longitudinal disposition thereupon in such manner as to register with said key.

The wheel-shaft is provided with a series of preferably flat-faced lugs, plates, or bars, which I term the "position-plates"  $b^x$ , which are all carried by and fixedly connected with said shaft, each of which is in effect a flattened peripheral portion or attachment of said shaft, all of which are within the range of the movement of the keys which respectively register with them, and each of which in the construction illustrated, wherein the shaft is of small diameter, is extended in the form of a tangential plate, adapted to present to the acting edge of the key a broad bearing-surface, the edge, as the key is depressed, moving into encounter with said plate and turning it until it comes to a close and firm bearing upon said plate on both sides of the axis of the shaft, as shown in Fig. 9.

A convenient form of position-plate is shown in Figs. 5, 6, and 7 of the drawings, in the application of which connection with the shaft is effected by set-screws  $b^o$ . The position-plates in the construction represented are arranged in two series corresponding, respectively, with the two tiers of the keys, the faces of the plates of the one series facing the rear edges of the keys of the front tier, while the faces of the plates of the other series face the front edges of the keys of the back tier. All of the plates are set at different angles, the inclination of the face of any given plate differing from that of the face of every other plate. Such being the fact, and the plate-striking edges of the keys being all, as shown, parallel, and the keys of either tier lying in the same vertical plane, it will be apparent that—no one of the position-plates, of course, in the normal set of the type-wheel and wheel-shaft occupying a position parallel with the striking-edge of its key, but all occupying positions at their upper edges inclined away from their respective keys—each key in its descent will encounter its own position-plate, will come to a bearing thereupon by deflecting said plate into parallelism with its own plate-striking edge, will consequently, in so doing cause the wheel-shaft and type-wheel to assume a different position circumferentially considered, and will, therefore, occasion the presentation to the platen of a given type upon the periphery of the wheel. The inclination of the face of each posi-

tion-plate is intentionally such as in the encounter of the key operating in connection with such plate will occasion such a rotation of the wheel-shaft and type-wheel as will bring into position opposite the platen the letter, number, or character upon said wheel which corresponds to the letter, number, or character upon the key operating in connection with said position-plate. The types preferably extend circumferentially over a segment of from ninety to one hundred and fifty degrees, and but a comparatively short rotation of the wheel will therefore be required to bring any particular type into position, and in consequence thereof the required inclinations of the various position-plates will be correspondingly small, as will be apparent from an inspection of Fig. 7 of the drawings. Of course, in practice the inclinations will be very much less than those shown in the drawings, which are more or less exaggerated the better to illustrate the idea.

It will of course be apparent that it is not essential to my invention that two tiers of keys should be employed, for a machine may be organized to possess either one tier or, under obvious modifications of arrangement, three or more tiers. Where, however, two tiers are employed, the general trend of the position-plates operative with the keys of the front tier is such that when such keys are operated forward rotation of the type-wheel will be imparted, while the general trend of the position-plates operative with the keys of the rear tier is such that when such keys are depressed backward rotation of the wheel will result. The depression of any key will, however, as stated, occasion a given rotation either forward or backward of the type-wheel.

The return of the type-wheel to a given normal set or position of rest with reference to the platen is conveniently accomplished either by loading the wheel, as is common in this class of machines, or, as shown in Fig. 13, by applying an automatically-acting spring-advanced shaft-returning plate  $B^x$ , which is mounted upon a stem  $B'$ , controlled by a spring  $B^2$ , and housed like a key in bearings in the key-rails, and the face of which is adapted to encounter a supplemental position-plate  $B^3$  upon the shaft and maintain such plate in a predetermined position of rest. The spring of the plate  $B^3$  is of course weak enough to be overcome by the key-action.

The type-wheel B is, as stated, provided as to a portion of its peripheral face with radially-projecting types  $b^2$ , which are caused to make their impress upon the paper or other material upon the face of the platen C by being pressed or forced from within radially outward against the same, conveniently by the action of a hammer  $g$ , connected with the hammer-slide G, hereinbefore referred to, which is set to strike against the back of the type from within or inside of the rim of the wheel, and so to force the type struck outwardly and toward the platen. The hammer-



slide G is mounted in a slide-bearing  $g'$ , fixed against the outside face of the right-hand frame-plate. The hammer  $g$  is, as shown in the drawings, connected with the rear extremity of its slide, while said slide itself is adapted to be moved horizontally forward or back by a pawl-lever P, pivoted against the inside face of the right-hand frame-plate by a pivot  $p$ , which lever is connected with said slide by a lever-pin  $p^x$ , passing through an opening  $p^2$  in the frame-plate A', and is at its upper extremity adapted to be encountered by the rocker-toe  $f'$  of the hammer rock-shaft whenever said shaft is rocked either by the encounter of a key-lug  $d'$  with its bail or by the depression of a spacing-key  $D^x$ , as hereinbefore set forth. The normal set of the hammer and hammer-slide is such that the hammer is normally back from the inside face of the rim of the wheel, such position being conveniently effected by a retracting-spring of any preferred character, but being preferably effected by the platen-actuating devices hereinafter referred to.

As will be understood from a consideration of Figs. 8 and 9, by reason of the lost motion between the key-lugs  $d'$  and the bail  $f$ , the rock-shaft is not rotated, and the hammer-slide consequently not advanced until after the lower extremity of a key has encountered, deflected, and, to a certain extent, slid past the face of its position-plate, and has, in consequence, effected a given rotation of the type-wheel. From this relationship of parts there necessarily results the bringing of a particular type into position with respect to the platen before the striking of such type to make its impress, and the locking of the type-wheel in position during the impression movement.

In order that the types may be susceptible of a radially in-and-out movement with respect to their carrying type-wheel, many modes of mounting or attaching them may be resorted to. I find it convenient to form upon or apply to the external or peripheral face of the type-wheel a band of rubber  $b'$ , out of the substance of which are formed, or to which are applied, the types  $b^2$ , and to form one or more circumferential openings or slots, which I term "hammer-slots"  $b^3$ , entirely through the rim of the wheel, so as to expose from within the said rim the back or under face of said type-carrying band. Through the slot or slots so formed the striking extremity of the hammer in its striking movement passes and come in contact with the rear face of said type-band, with the result of forcing the portion of the band encountered, and the type which that portion of the band carries, forward against the platen. Upon the retraction of the hammer the band, which under its impulse was bellied out, by virtue of its own elasticity, resumes its normal set. Of course, if desired, the types may be otherwise applied, as well understood in the art. In the application of the type-carrying rubber band I find it convenient to provide the wheel with

three parallel circumferential rows of types, in connection with which the single hammer is adapted by the lateral shifting of the wheel to do duty. This lateral or sidewise shifting of the wheel, in order to bring a given row of its types into range of contact with the hammer, I can accomplish by the following devices, it being of course understood that the hammer is normally in range of one of the rows of type, and that therefore but two sidewise shifts of different extent are requisite.

S, Fig. 1, is a hollow sleeve snugly fitted upon and feathered with respect to the wheel-shaft and keyed fast at its outer extremity to the type-wheel. While, therefore, the wheel and sleeve are free to be shifted lengthwise of the shaft—that is to say, sidewise of the wheel—they are both compelled to rotate with said shaft, which is in effect housed in its bearing in the right-hand frame-plate through the intervention of said sleeve, to which its bearing is conformed. Between the wheel and the outside of the right-hand frame-plate is applied a wheel-spring  $b^5$ , which normally serves to maintain the wheel far enough to the right to present its left-hand row of types, which are those most frequently used, to the action of the hammer. The shifts of the wheel are therefore inward or to the left hand, accompanied by the compression of the wheel-spring, and accomplished by the contact against a lever-collar  $b^4$  on the inner end of the sleeve of a shifting-lever L, fulcrumed against the inside face of the frame-plate A' and adapted to be encountered by either of two shifting-keys J  $J^x$ , housed in the key-rails and having cam-surfaces  $j$   $j^x$ , Fig. 8<sup>a</sup>, of different contour, which, respectively, upon the depression of their respective shifting-keys, effect lateral movements of different length in said shifting-lever, and consequently, through its contact with the lever-collar on its sleeve, in said sleeve and in the type-wheel. Other devices than the foregoing may of course be employed for the same purpose. It is further obvious that upon the release and ascent of the depressed shifting-key the wheel-spring will occasion the return of the shaft and type-wheel to their previous position, the incidental return of the lever with the shaft occasioning the elevation of the shifting-key, an action, however, that may be either aided or, in fact, wholly performed by a lifting-spring applied to the shifting-key, similar to that shown in connection with the keys operating the type-wheel. In the construction represented one of the shifting-keys will bring the second hammer-slot of the type-wheel in range of the hammer, while the other key will bring the third slot in range of said hammer, the first slot being, as stated, normally in range.

The foregoing arrangement of a series of parallel circumferential rows of types upon the face of the type-wheel is one of convenience merely, and one which enables me to compress within the compass of a short arc



of the type-wheel a large number of types. Of course, if desired, more or less than three rows of type may be employed, and obviously a single row will effectuate the invention, although it will necessitate long rotary throws of the type-wheel.

In order, if desired, to provide the type-wheel with alphabets of different fonts of type, it is easy to divide the circumference of said wheel into two, three, or more segments, each of which shall contain an alphabet of a given font, style, or character of type, and to so apply the wheel that it can be adjusted with respect to its circumferential set upon its shaft.

K, Figs. 1 and 12, is a segmental inking-pad, so set that in the rotative movement of the type-wheel it serves to supply ink to the faces of the types. It is supported, as convenience of manufacture may dictate, preferably from the right-hand frame-plate, as shown in the figures mentioned. The pad is of course either made in two parts or provided with a transverse slot or opening in the part facing the platen, so as not to interfere with the printing action of the types. It is manifest that the pad K is, moreover, simply one of many contrivances which may be employed for inking the types, and that it is equally possible to ink them by rollers or other well-known devices, and also possible to dispense with all such devices and employ an inking-ribbon, as commonly used in writing-machines.

Having now explained the devices by which the types are selected and brought into action against the platen, it is proper to state that in connection with them platens of various character and actuated to the requisite movement by various contrivances may be employed. As convenient for the purpose I have devised the following contrivances, which are also set forth in my former application.

M is what I term the "platen-carrier," the same being composed of a base-bar of preferably rectangular cross-section, having upright end arms  $m$ , and which is mounted for longitudinal travel in either direction in a carrier-way N, which is a gutter-shaped device corresponding cross-sectionally to the form of the base-bar of the platen-carrier and fixed longitudinally of the machine, conveniently by being connected with the frame-plates, as shown in Figs. 1, 8, 9, 12, and 13. The base-bar of the platen-carrier has upon its front face a rack  $m^x$ , and its arms  $m$  are each provided with a vertical slot  $m'$ , to which are respectively adapted the respective extremities  $c$   $c$  of the platen C, so that said platen can be easily dropped into its carrier in such manner as to become temporarily a part thereof, or be easily lifted from out it. The longitudinal predetermined travel of the platen-carrier and platen is occasioned by the action of an intermittently-operated pawl O, hereinafter described. The platen is prefer-

ably provided with angular top and bottom edges  $c'$   $c^2$ , between which its face, designated by the letter C, is a flat surface, against which the paper or other writing material lies flat, and which receives the thrust or stroke of the types. The extremities of the top and bottom edges of the platen are intumed to form, or otherwise conveniently provided with, lugs or ears  $c^x$ , which, respectively, by being perforated, serve as the journal-bearings for a tension roller  $c^3$ , applied between the ears of the bottom edge of the platen, and for a feed-roller  $c^4$ , applied between the ears of the top edge of the platen and conveniently provided with a thumb-knob  $c^5$ , by the manual rotation of which the said feed-roller is rotated in order to occasion the feed of the paper upon the platen transversely across the face of said platen. Both the tension-roller and the feed-roller bear closely against the respective edges of the platen and serve to maintain the surface of the paper taut against the face of said platen. The feed-roller is conveniently rubber-faced, so as to insure the requisite bite upon the paper.

In order to gage the transverse feed of the paper across the platen, I find it convenient to provide the extremity of the feed-roller opposite to that which carries the thumb-knob  $c^5$  with a guttered gage-disk  $c^6$ , the gutters  $c^7$  of which are simply peripheral notches, employed in any desired series, into which successively enters and engages a lug  $c^8$  on the extremity of a feed-roller spring  $c^9$ , secured, as shown in Fig. 4, to the platen. It is obvious that the foregoing contrivance will automatically serve to guide the touch of the operator in his manual rotation of the feed-roller and thereby conveniently and accurately secure a predetermined advance of the paper.

As already stated, the longitudinal intermittent travel of the platen and platen-carrier in the arrangement represented from the right to the left hand of the machine is conveniently secured by the action of a pawl against the rack-provided face of the base of the platen-carrier. The pawl may be actuated by many contrivances, and is preferably actuated direct from the keys, conveniently, by the following connective mechanism intermediate between it and said keys. P is, as stated, a pawl-lever, the upper extremity of which in the oscillation of the hammer rock-shaft and throw of the rocker-toe is deflected toward the rear of the machine, so as to occasion the advance of the hammer-slide in its type-striking movement. The lower extremity of said lever bears against the rear portion of or is pivotally or otherwise connected with a pawl-carrier Q, the same being a slide-bar housed for endwise movement, preferably in a horizontal plane and from front to rear of the machine, in a slide-bearing  $q$ , conveniently affixed to the inside face of the right-hand frame-plate. To the rear portion of this pawl-carrier is, by a vertical pivot  $q'$ ,



pivoted a double-toothed platen-pawl O, which is provided with a pawl-spring O<sup>x</sup>, conveniently affixed at its front extremity to the pawl-carrier, and which, as to its rear extremity, exerts its influence against the back face of the pawl to normally maintain it in the position shown in Fig. 10. The front portion of said carrier is conveniently encircled by a carrier-spring q<sup>2</sup>, which abuts between a shoulder q<sup>3</sup> on the carrier and a resisting abutment q<sup>4</sup> on the frame-plate. It will now be obvious that when the hammer-slide is under the action of the rocker-toe advanced to occasion the striking of the type, the lower extremity of the pawl-lever will be deflected toward the front of the machine in such manner as to occasion the backward movement of the pawl-carrier, the compression of the carrier-spring; and the removal of the platen-pawl from the rack-teeth, with which its extremities were, as shown in Fig. 11, engaged, until, under the influence of the pawl-spring, the pawl assumes the position shown in Fig. 10, and that therefore during the period of the impression of the type upon the paper the platen-carrier will be at rest and the platen-pawl angled into position necessary for the engagement of its inside tooth with the next succeeding rack-tooth in order to insure the requisite subsequent advance of the platen-carrier upon the retreat of the hammer-slide under the release of the type-key, and consequent redeflection of the pawl-lever under the influence of the expansion of the pawl-carrier-spring. In other words, upon the drop or redeflection of the rocker-toe in the ascent of the key the recoil or expansion of the spring q<sup>2</sup> of the pawl-carrier will occasion the advance of said pawl-carrier, will, through the intervention of the platen-pawl occasion the consequent left-hand advance of the platen-carrier and platen, the redeflection of the pawl-lever, and the consequent retreat of the hammer-slide and hammer.

From a consideration of the foregoing mechanism it will be apparent that each stroke or depression of a key is accompanied by a predetermined longitudinal advance of the platen, and consequently by a predetermined longitudinal feed of the paper transversely across the type-face of the type-wheel. When the platen-carrier and platen have completed their longitudinal travel to the left hand, their return to their normal right-hand position may be conveniently effected by hand. The platen-pawl, as will be apparent from an inspection of Fig. 11, is provided with a heel or shoulder q<sup>5</sup>, which, as the spring deflects the pawl, will abut against the pawl-carrier and serve to maintain the pawl in the inclined position represented in Fig. 10, in which position it is upon the next backward movement of the pawl-carrier adapted to be engaged with the next tooth of the rack of the carrier.

The object of making the pawl double—that is to say, of providing it with two ex-

tremital teeth—is by the engagement of both of said teeth simultaneously with rack-teeth, as shown in Fig. 11, to prevent the movement of the platen-carrier in either direction and effectually to lock it in its then position. Of course the depression of either of the two spacing-keys D<sup>x</sup> necessarily occasions the advance of the hammer, but the type-wheel being during the depression of either of said keys at its normal position of rest is constructed either to then present to the hammer a portion of its type-carrying band which is unprovided with a type, and the outward radial thrust of which portion is consequently without effect upon the paper, or else to present to said hammer simply an opening through its rim not covered by said band.

The operation of a machine embodying the foregoing construction will now, from the preceding description of that construction, be sufficiently understood. It is preferable to arrange the keys in a double bank, staggering or alternating them by keys of the respective banks, and making the keys of the front bank slightly lower than those of the rear, an arrangement easily accomplished by shortening the upper portion of the keys above the key-lugs.

It will be understood that, by the application of the shifting-keys already referred to, it is possible to cause a given key to do duty for the same letter in upper and lower case, or for given letters and given punctuation-marks or numerals. Expedients of operation of this character are obvious to those skilled in the use of this class of machine. It is likewise apparent that changes in the detail and arrangement of mechanical construction of intermediate or connective mechanism and of minor parts can be resorted to without departure from the invention, broadly, as such and as I have endeavored to explain it.

If desired, the type-wheel and the type-striking and platen-actuating mechanisms may be applied at the left-hand instead of at the right-hand side of the machine. If desired also, the type-striking and platen-actuating mechanism may, according to the set of the type-wheel, be applied to the inside instead of to the outside of either frame-plate, while, as is also apparent, a paper carrying and supporting cage or rack may be connected with the platen-carrier to insure the support of the paper.

Having thus described my invention, I claim—

1. In a type-writing machine, the combination of a shaft provided with a position-plate, a type-wheel carried by said shaft, and a sliding key rotating and locking the shaft by engagement with the position-plate on both sides of the axis of the shaft, substantially as described.

2. In a type-writing machine, the combination of a shaft provided with a position-plate, a type-wheel carried by said shaft, a key moving transversely to said shaft and rotating and



locking the shaft by engagement with the position-plate on both sides of the axis of the shaft, and mechanism operated by the key to produce the impression without movement of the type-wheel, substantially as described.

3. In a type-writing machine, the combination of a shaft provided with a position-plate, a type-wheel carried by said shaft, a key moving transversely to said shaft and rotating and locking the shaft by engagement with the position-plate on both sides of the axis of the shaft to position the type-wheel, said key having a further movement independent of the type-wheel after the type-wheel is positioned, and an impression mechanism operated by the further movement of the key, substantially as described.

4. In a type-writing machine, the combination of a shaft provided with a position-plate, a type-wheel carried by said shaft, a key moving transversely to said shaft and rotating and locking the shaft by engagement with the position-plate on both sides of the axis of the shaft to position the type-wheel, said key having a further movement independent of the type-wheel after the type-wheel is positioned, and impression and feeding mechanisms operated by the further movement of the key, substantially as described.

5. In a type-writing machine, the combination of a shaft provided with a position-plate, a type-wheel carried by said shaft, a key moving transversely to said shaft and rotating and locking the shaft by engagement with the position-plate on both sides of the axis of the shaft to position the type-wheel, said key having a further movement after the type-wheel is positioned, a hammer operated by the further movement of the key, a paper-carrier, and connections between the hammer and paper-carrier for feeding the latter, substantially as described.

6. In a type-writing machine, the combination of a shaft provided with a series of position-plates, a corresponding series of keys moving transversely to the shaft and rotating and locking said shaft by engagement with the position-plates on both sides of the axis of the shaft, the engaging surfaces of the different keys and position-plates varying in inclination, a type-wheel carried by said shaft, and mechanism operated by the keys for producing the impression without movement of the type-wheel, substantially as described.

7. In a type-writing machine, the combination of a shaft provided with a series of position-plates at varying inclinations to the shaft, a corresponding series of keys moving transversely to the shaft and rotating and locking said shaft by engagement with the position-plates on both sides of the axis of the shaft, a type-wheel carried by said shaft, and mechanism operated by the keys for producing the impression without movement of the type-wheel, substantially as described.

8. In a type-writing machine, the combination of a type-carrier, a shaft by the rotation of

which the type-carrier is positioned and provided with a position-plate extending on both sides of its axis, and a sliding member moving transversely to and past said shaft and rotating the same by engagement with the position-plate to position the type-carrier, said position-plate being normally at an angle to the line of movement of the sliding member, but parallel therewith and with the engaging surface of the sliding member when the type-carrier is positioned, substantially as described.

9. In a type-writing machine, the combination of a type-wheel, a shaft carrying the type-wheel and provided with a position-plate extending on both sides of its axis, and a sliding member moving transversely to and past said shaft and rotating the same by engagement with the position-plate to position the type-wheel, said position-plate being normally at an angle to the line of movement of the sliding member, but parallel therewith and with the engaging surface of the sliding member when the type-wheel is positioned, substantially as described.

10. In a type-writing machine, the combination of a type-wheel, a shaft carrying the type-wheel and provided with a position-plate extending on both sides of its axis, and a sliding key moving transversely to and past said shaft and rotating the same by engagement with the position-plate to position the type-wheel, said position-plate being normally at an angle to the line of movement of the key, but parallel therewith and with the engaging surface of the key when the type-wheel is positioned for the impression of the type corresponding to the key, substantially as described.

11. In a type-writing machine, the combination of a type-wheel, a shaft carrying the type-wheel and provided with a position-plate extending on both sides of its axis, a sliding member moving transversely to and past said shaft and rotating the same by engagement with the position-plate to position the type-wheel, said position-plate being normally at an angle to the line of movement of the sliding member, but parallel therewith and with the engaging surface thereof when the type-wheel is positioned, and an impression mechanism operated by the further movement of the key after the type-wheel is positioned, substantially as described.

12. In a type-writing machine, the combination of a type-wheel, a shaft carrying said type-wheel and provided with a position-plate extending on both sides of its axis, a sliding member moving transversely to and past said shaft and rotating the same by engagement with the position-plate to position the type-wheel, said position-plate being normally at an angle to the line of movement of the sliding member, but parallel therewith and with the engaging surface thereof when the type-wheel is positioned, and impression and feeding mechanisms operated by the further move-



ment of the key after the type-wheel is positioned, substantially as described.

13. In a type-writing machine, the combination of a type-wheel, a shaft carrying said type-wheel and provided with a series of position-plates extending on both sides of its axis, and a corresponding series of sliding members moving transversely to and past said shaft and rotating the same by engagement with the position-plates to position the type-wheel, said position-plates being normally at different angles to the line of movement of their respective sliding members, but parallel therewith and with the engaging surfaces thereof when the type wheel is positioned for the impression of the type corresponding to the respective sliding members, substantially as described.

14. In a type-writing machine, the combination of a type-wheel, a shaft carrying said type-wheel and provided with a series of position-plates extending on both sides of its axis and at different angles thereto, and a corresponding series of sliding members moving transversely to and past said shaft and rotating the same by engagement with the position-plates to position the type-wheel, said position-plates being normally at different angles to the line of movement of their respective sliding members, but parallel therewith and with the engaging surfaces thereof when the type-wheel is positioned for the impression of the type corresponding to the respective sliding members, substantially as described.

15. In a type-writing machine, the combination of a type-wheel, a shaft carrying said type-wheel and provided with a series of position-plates extending on both sides of its axis and at different angles thereto, a corresponding series of sliding keys moving transversely to and past said shaft and rotating the same by engagement with the position-plates to position the type-wheel, said position-plates being normally at different angles to the line of movement of their respective keys, but parallel therewith and with the engaging surfaces thereof when the type-wheel is positioned for the impression of the type corresponding to the respective keys, and an impression mechanism operated by the further movement of a key after the type-wheel is positioned, substantially as described.

16. In a type-writing machine, the combina-

tion of a type-wheel, a shaft carrying said type-wheel and provided with a series of position-plates extending on both sides of its axis and at different angles thereto, a corresponding series of sliding keys moving transversely to and past said shaft and rotating the same by engagement with the position-plates to position the type-wheel, said position-plates being normally at different angles to the line of movement of their respective keys, but parallel therewith and with the engaging surfaces thereof when the type-wheel is positioned for the impression of the type corresponding to the respective sliding keys, and impression and feeding mechanisms operated by the further movement of a key after the type-wheel is positioned, substantially as described.

17. The combination of a type-wheel, a shaft carrying said type-wheel and provided with two series of position-plates extending transversely to the shaft and placed on opposite sides of its axis, the plates of each series being set at varying angles to the shaft, and two series of sliding keys moving transversely to and past said shaft and rotating the same by engagement with the position-plates to position the type-wheel, said position-plates being normally at different angles to the line of movement of their respective keys, but parallel therewith and with the engaging surfaces thereof when the type-wheel is positioned for the impression of the type corresponding to the respective keys, substantially as described.

18. The combination, with type-wheel B, of shaft *d*, provided with one or more series of position-plates *d'*, impression and feeding mechanisms, rock-shaft F, connected to and operating said mechanisms, bail *f*, by which the rock-shaft is operated, and one or more series of keys, as *D'*, engaging said position-plates for positioning the type-wheel and engaging the bail for the operation of the impression and feeding mechanisms after the type-wheel is positioned, substantially as described.

In testimony that I claim the foregoing as my invention I hereunto sign my name this 1st day of July, A. D. 1889.

JACOBS W. SCHUCKERS.

Witnesses:

JOHN J. BRADLEY,  
A. HORBACK.