

No. 621,742.

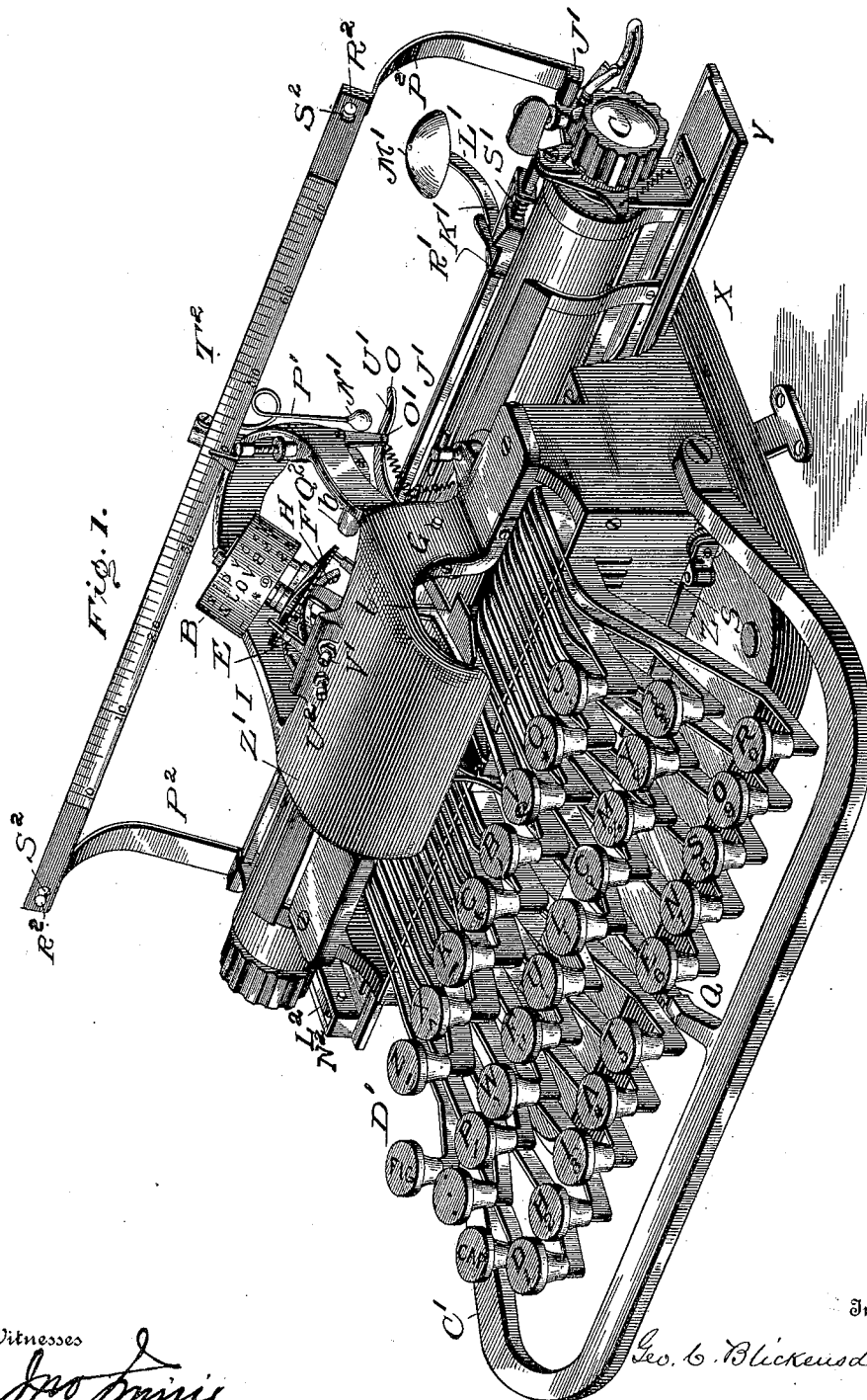
Patented Mar. 21, 1899.

G. C. BLICKENSBERGER.
TYPE WRITING MACHINE.

(Application filed Oct. 13, 1897.)

(No Model.)

10 Sheets—Sheet 1.



Witnesses

Geo. W. Moore
A. Curtis Hammond

Inventor

Geo. C. Blickensderfer

By *Geo. W. Moore* Attorney

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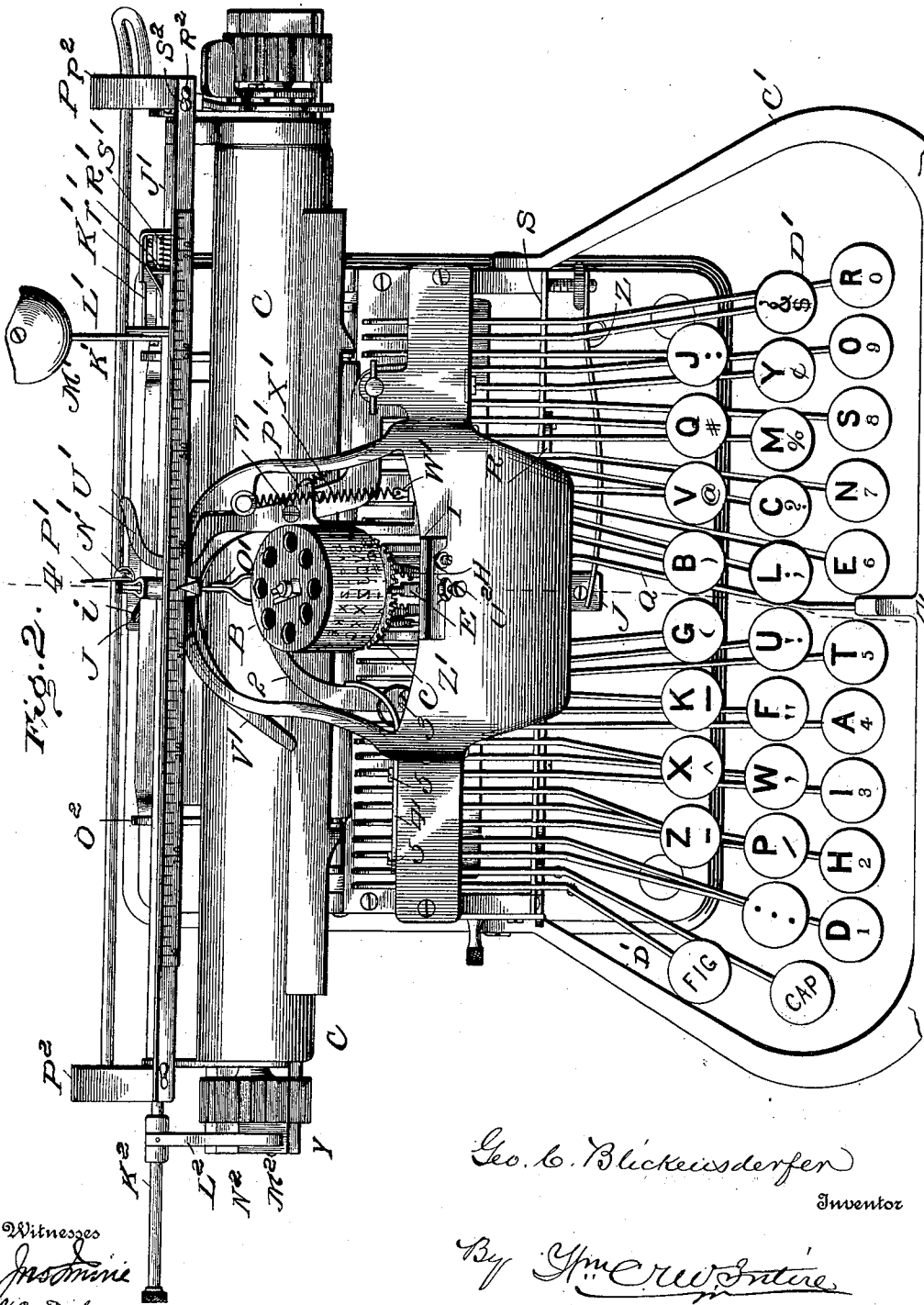
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10 Sheets—Sheet 2.



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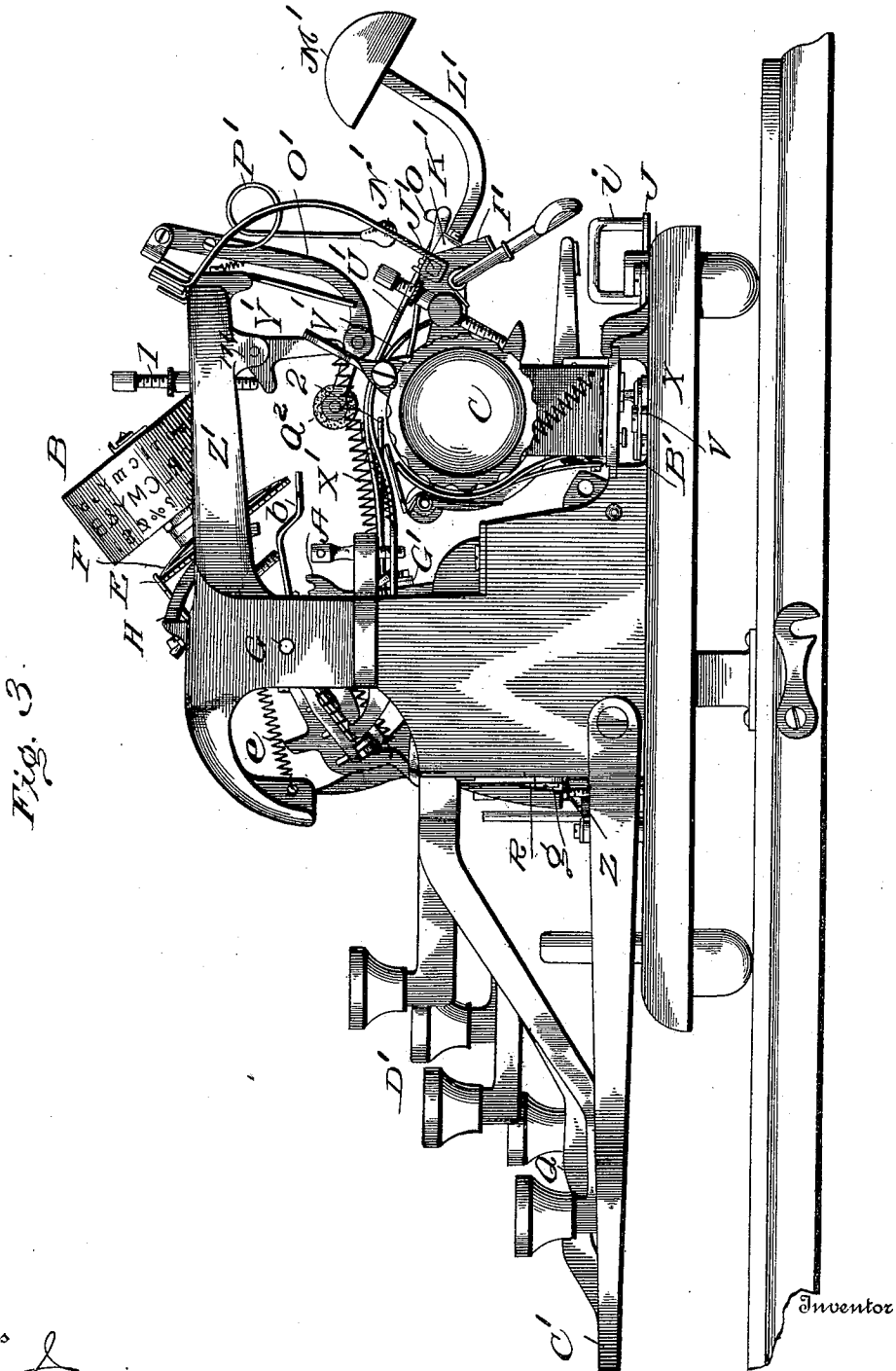
Patented Mar. 21, 1899.

G. C. BLICKENS DERFER.
TYPE WRITING MACHINE.

(Application filed Oct. 18, 1897.)

(No Model.)

10 Sheets—Sheet 3.



Witnesses
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No. 621,742.

Patented Mar. 21, 1899.

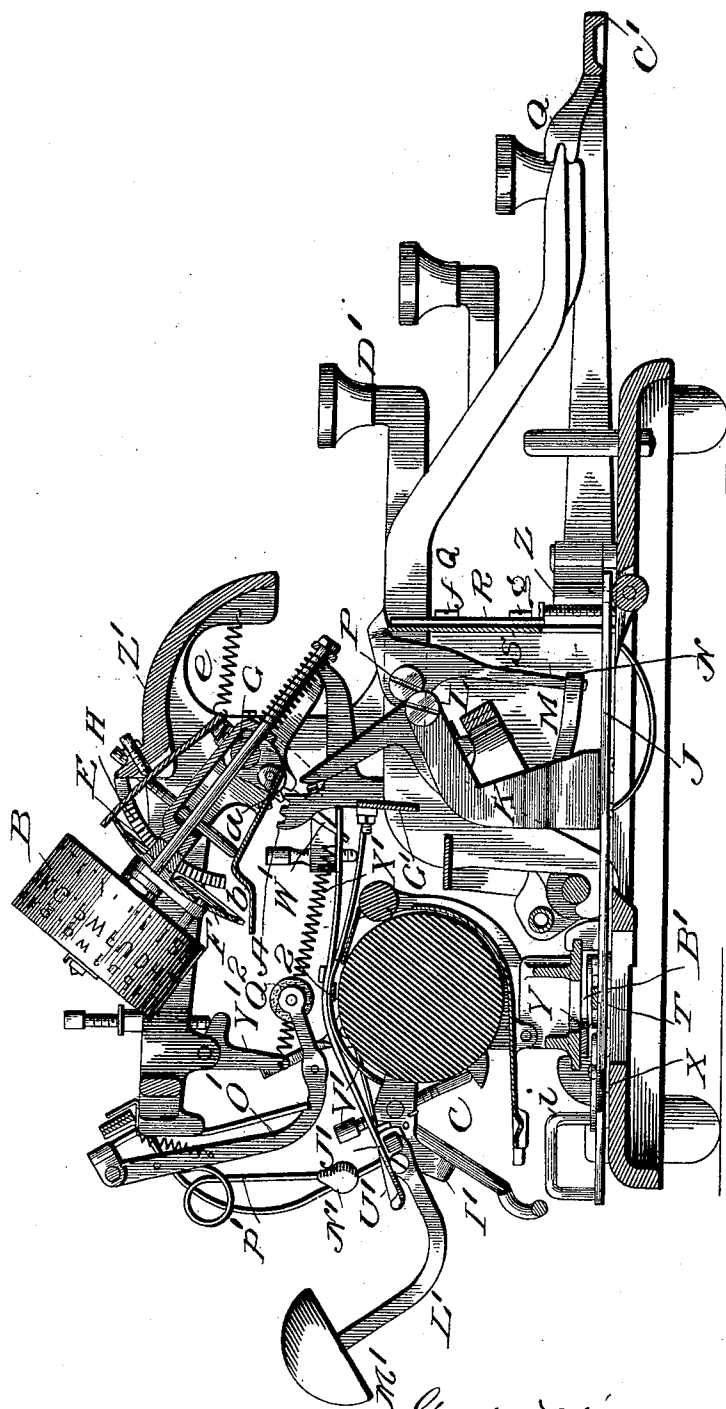
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(Application filed Oct. 13, 1897.)

(No Model.)

10 Sheets—Sheet 4.

Fig. 4.



Witnesses

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Patented Mar. 21, 1899.

G. C. BLICKENSDEKFER.
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10 Sheets—Sheet 5.

Fig. 5.

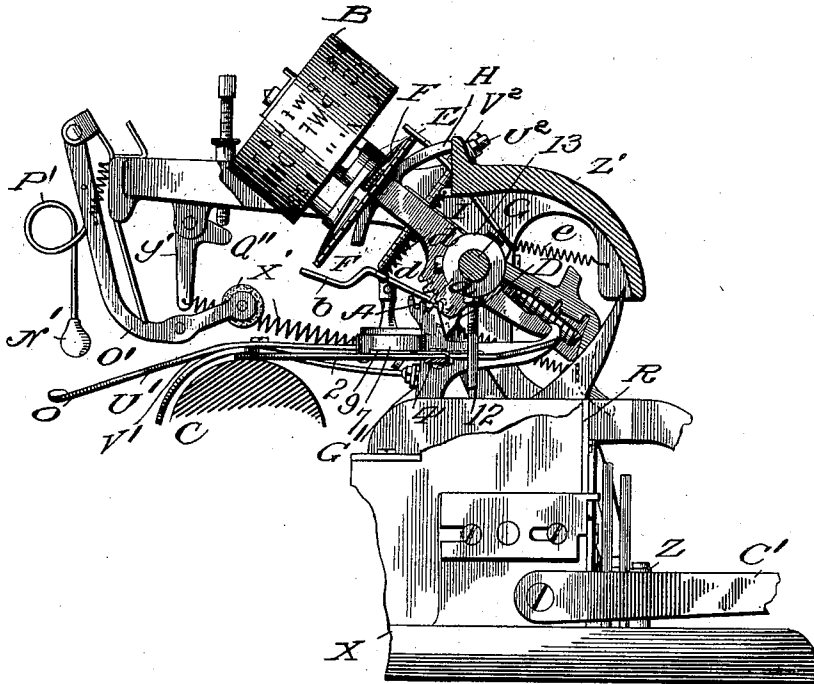
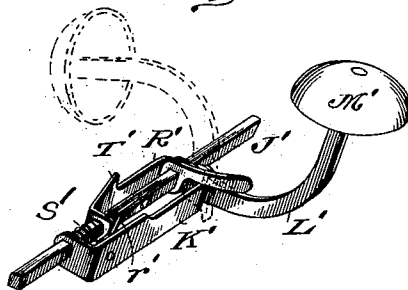


Fig. 30.



Witnesses

John Miller
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No. 621,742.

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10 Sheets—Sheet 6.

Fig. 6.

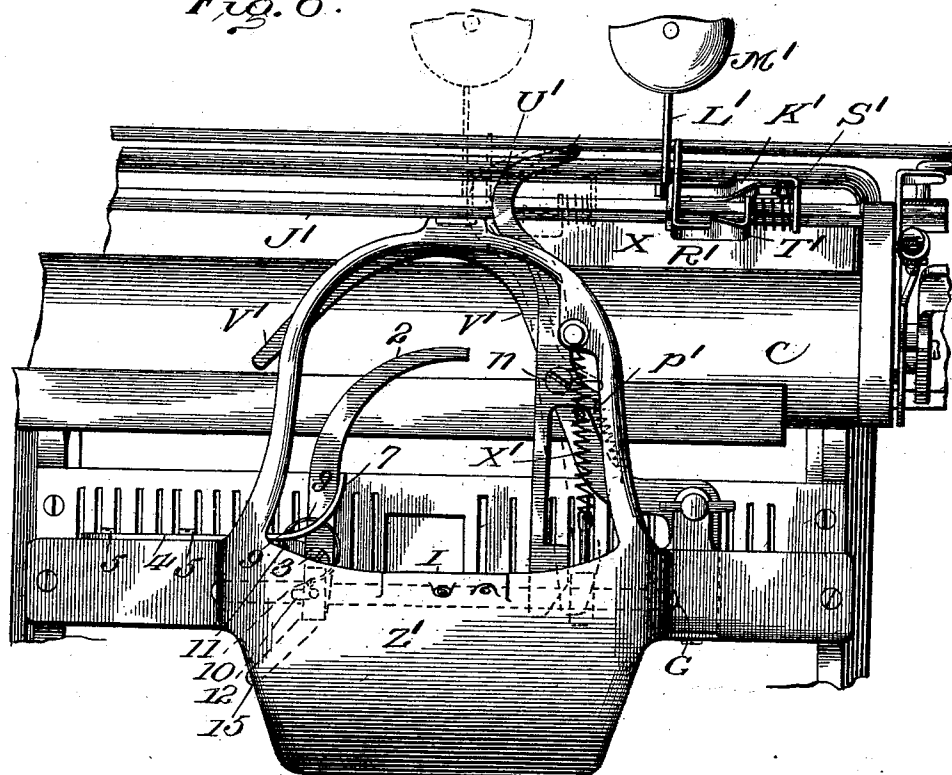


Fig. 7.

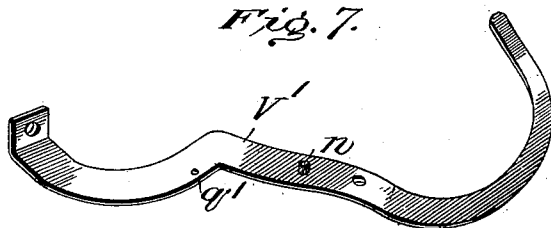


Fig. 9.

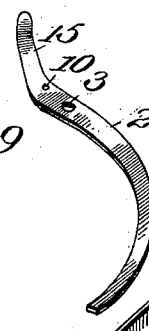


Fig. 10.

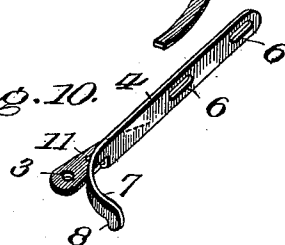
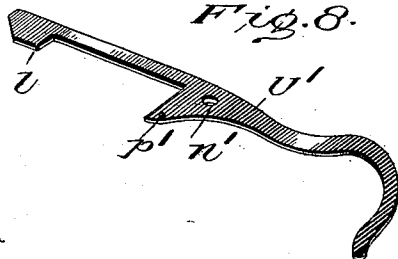


Fig. 8.



Witnesses

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(Application filed Oct. 13, 1897.)

10 Sheets—Sheet 7.

(No Model.)

Fig. 11.

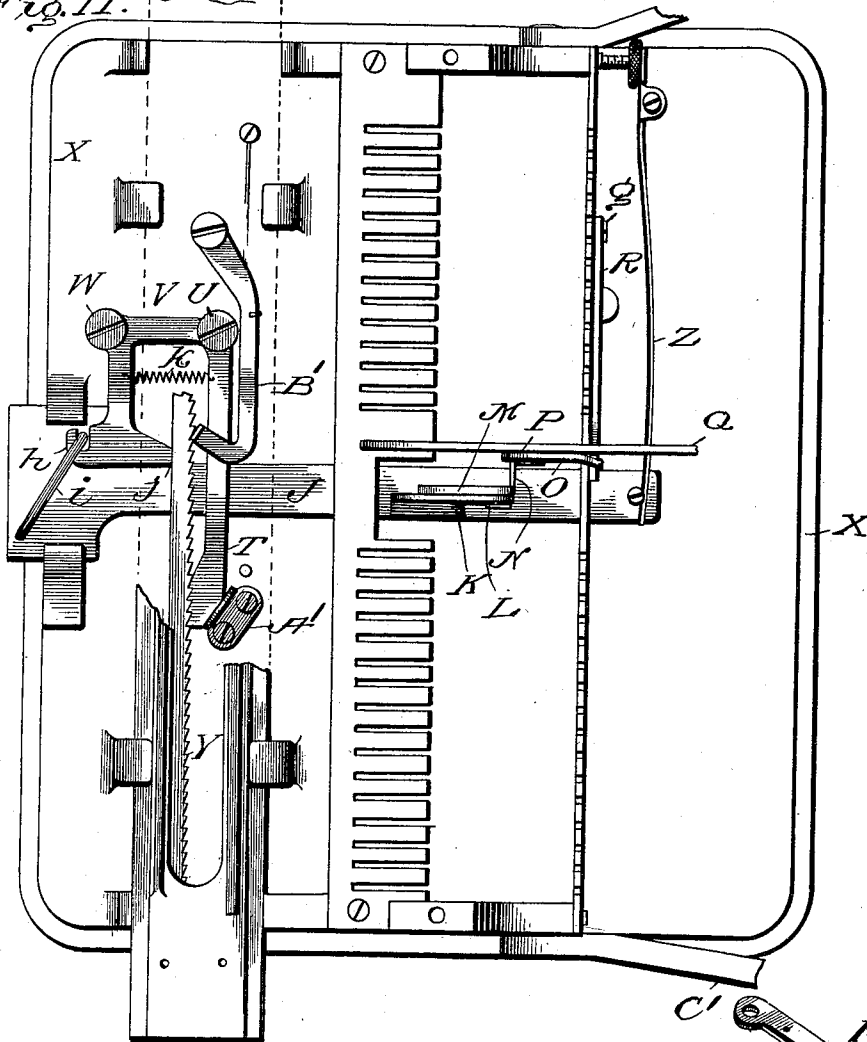


Fig. 12.

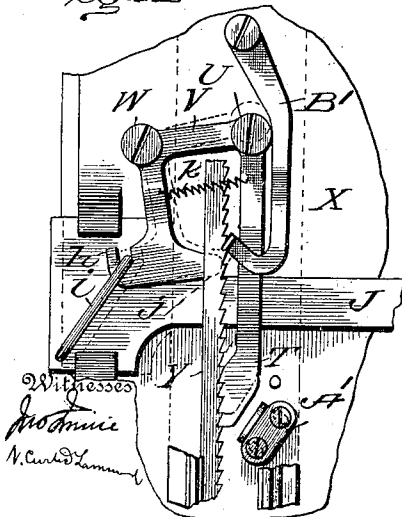


Fig. 13.

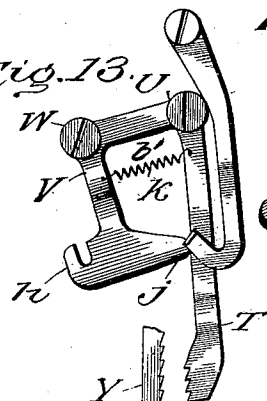


Fig. 15.

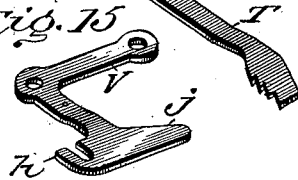
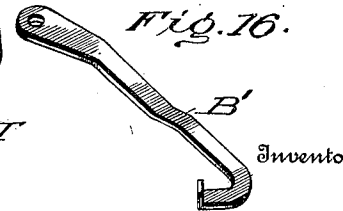


Fig. 16.



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10 Sheets—Sheet 8.

Fig. 17.

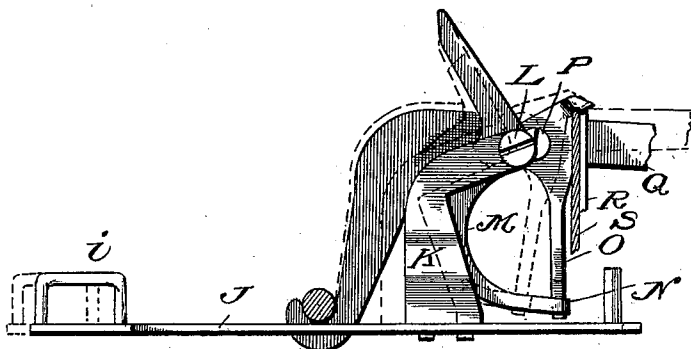


Fig. 18.

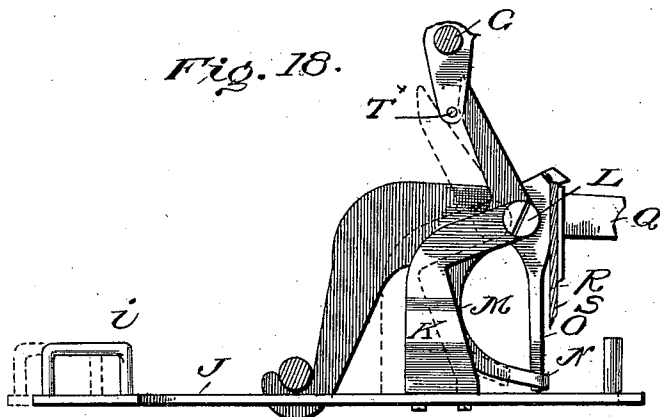


Fig. 19.

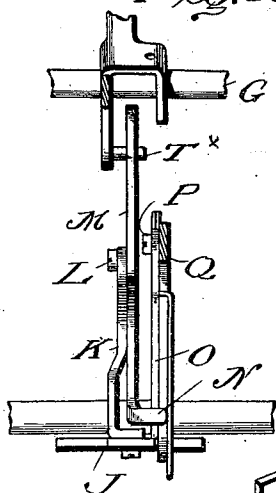


Fig. 20.

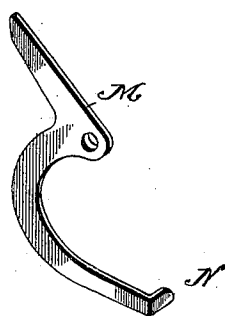


Fig. 21.

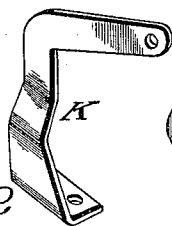
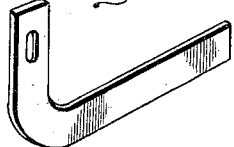


Fig. 23.



Fig. 22.



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Fig. 24.

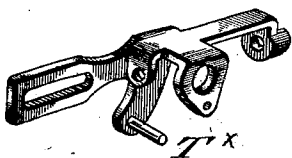


Fig. 25.



Fig. 27.

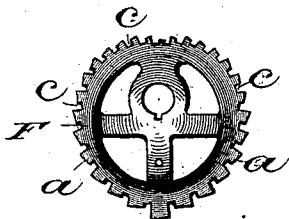


Fig. 28.

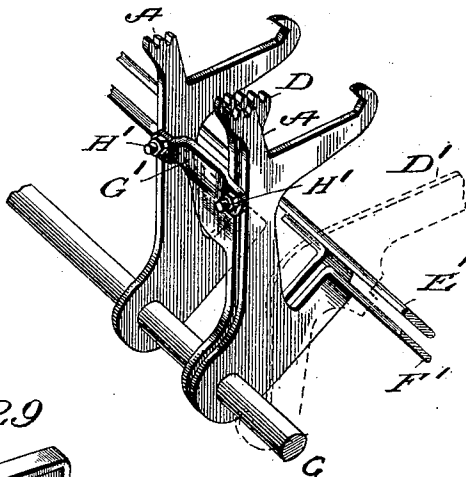


Fig. 26.

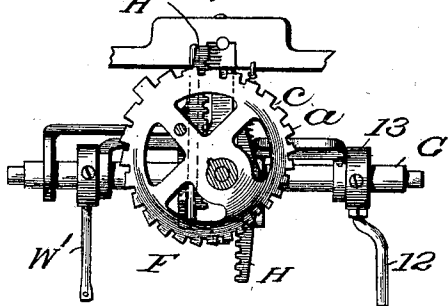
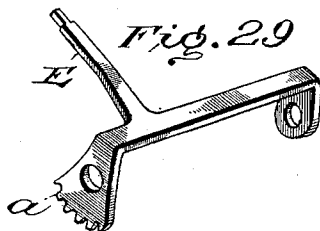


Fig. 29.



Witnesses

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Inventor.

Geo. C. Blickensderfer
By J. M. C. W. Little

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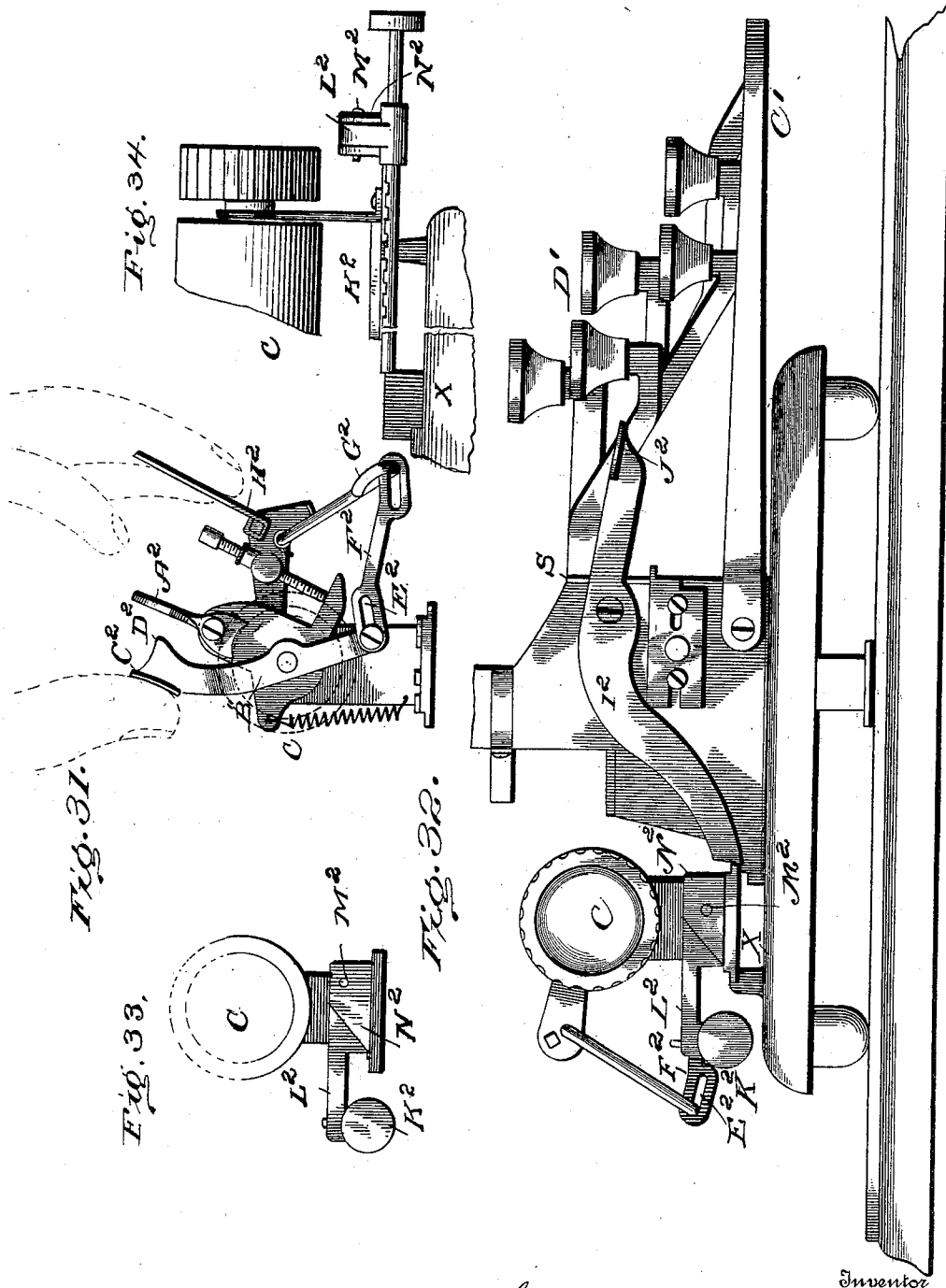
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G. C. BLICKENS DERFER.
TYPE WRITING MACHINE.

(Application filed Oct. 13, 1897.)

(No Model.)

10 Sheets—Sheet 10.



Witnesses

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Geo. C. Bleckensderfer

By Ym. C. W. Entere Attorney

UNITED STATES PATENT OFFICE.

GEORGE C. BLICKENS DERFER, OF STAMFORD, CONNECTICUT.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 621,742, dated March 21, 1899.

Application filed October 13, 1897. Serial No. 655,050. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. BLICKENS-
DERFER, a citizen of the United States, resid-
ing at Stamford, in the county of Fairfield
and State of Connecticut, have invented cer-
tain new and useful Improvements in Type-
Writing Machines; and I do hereby declare
the following to be a full, clear, and exact de-
scription of the invention, such as will enable
others skilled in the art to which it appertains
to make and use the same.

My invention relates to certain new and use-
ful improvements in type-writing machines
of that class in which the type and other char-
acters are displayed upon a revoluble wheel
which is caused to revolve and when neces-
sary to move longitudinally upon its axis
through the medium of levers, the free ends
of which constitute the keyboard.

A good illustration of the character or type
of type-writing machines to which my inven-
tion appertains is illustrated and described
in Letters Patent No. 583,840, granted to me
on the 1st day of June, 1897.

My present invention has for its objects,
first, to provide a construction which will dis-
pense with the ratchet-wheel on the type-
wheel shaft and the pawl on the comb, as
shown in my patent above referred to, by
which the wheel is stopped and held in posi-
tion after the type or other character has
been brought into position for printing, there
being a slight tendency with such construc-
tion to blurring, as the pawl on the rear comb
steadies the wheel just at the time it strikes
the paper, and in lieu thereof to provide a
gear for drawing the front pawl into the heart-
shaped ratchet on the wheel-shaft and so con-
struct said ratchet that both the front and
rear pawls shall be so located as to secure
absolute steadiness in the wheel after it has
been rotated to any desired point; second, to
so construct and arrange the automatic spacer
that an extra space may be made when the
last letter of a word and the spacer-bar are
simultaneously depressed; third, to so ar-
range the alarm-bell that it may be readily
adjusted to give the alarm at any desired
point in the travel of the paper-carriage and
also to positively stop the latter if the oper-
ator fails to heed the admonition given by
the bell; fourth, to provide a pointer which

shall always be in position and which shall
move out of the way on the downward move-
ment of the keys; fifth, to provide an addi-
tional vibratory thumb-piece and connections
on the paper-carriage by means of which the
paper-roll may be rotated and the feed re-
leased at the same time; sixth, to provide a
simple attachment by means of which the
feed movement of the paper-carriage may be
arrested whenever an occasion arises when
such action is desirable, and, seventh, to pro-
vide improved construction in some of the de-
tails, such as the means for releasing the feed
at the same time the paper-carriage is rotated,
means for temporarily suspending the action
of the feed after its power has been stored
up, and in novel means for securing the in-
dex scale-bar in a removable position, all as
will be hereinafter more fully described and
claimed. With these objects in view my in-
vention consists in the details of construction
and arrangement hereinafter more fully de-
scribed.

In order that those skilled in the art to
which my invention appertains may know
how to make and use the same, I will proceed
to describe the construction, arrangement,
and operation of the same, referring by let-
ters and figures to the accompanying draw-
ings, in which—

Figure 1 is a perspective view, Fig. 2 is a
plan view, and Fig. 3 is a side view, looking
from the right-hand side of the machine. Fig. 4
is a section on the line 4 4 of Fig. 2, showing
the double-spacing mechanism in full lines. Fig. 5
is a detail side elevation, with parts broken away,
from the left-hand side of the machine. Fig. 6
is a plan view with parts omitted to show more
clearly the paper-guide, the stop-lever, and the
pointer. Figs. 7, 8, 9, and 10 are detail views
showing the paper-guide, lever, and stop above
referred to. Fig. 11 is a plan view of the spac-
ing mechanism, the operating parts of the
type-writer being omitted. Fig. 12 is a simi-
lar view showing the mechanism as having
made a single space, a double-space move-
ment being shown in dotted lines. Fig. 13 is
a plan view showing the pawls out of engage-
ment. Figs. 14, 15, and 16 are detail per-
spective views of the pawls. Fig. 17 is a side
elevation of the double-spacing mechanism,

showing the parts as having made a single space. Fig. 18 is a similar view showing the pawls as having made a double space. Fig. 19 is a detail front view of the same. Figs. 20, 21, 22, and 23 are perspective views of the parts of the spacing mechanism. Fig. 24 is a detail perspective view of the support for the shaft of the type-wheel, ratchet-wheel, and pawl. Fig. 25 is a detail perspective view of the pawl. Fig. 26 is a detail view showing the pawl-and-ratchet movement and pins which operate the pointer and stop-bar. Fig. 27 is a plan view of the ratchet-wheel. Fig. 28 is a detail perspective view of the operating-levers which give rotary motion to the type-wheel. Fig. 29 is a perspective view of what I denominate the "selecting-finger." Fig. 30 is a detail perspective view showing the adjustable bell mechanism. Fig. 31 is a detail end view of the paper-carriage, showing means for rotating the paper-carriage and at the same time releasing the feed. Fig. 32 is a detail end view of the machine, showing a feed-arresting lever secured in place on the frame of the machine and within easy reach of the operator. Fig. 33 is a partial end view showing a stop-rod and its connections, by means of which the return movement of the paper-carriage is controlled to secure any desired margin to the printed matter; and Fig. 34 is a partial rear view of the same, showing in addition the shoulder or stop on the machine against which the end of the adjustable stop-rod abuts.

Similar letters and numerals of reference indicate like parts in the several figures of the drawings.

The mechanism by and through which the type-wheel is rotated to bring any given character into proper position and to impel it against the paper is substantially the same as that shown and described in my Letters Patent hereinbefore referred to and need not be here specifically described; but simply designated by letters and figures to make clear the general construction and operation.

A are the sectors secured to the bails which are depressed by the key-levers and operate the mechanism by which the type wheel or cylinder B is rotated on its axis to bring any desired character in proper position to be impressed upon the sheet on the paper-carriage C, all as fully described in Letters Patent No. 583,840, granted to me June 1, 1897. The sectors A are vibrated upon their axes by the depression of the key-levers upon the swinging bails, as described in the Letters Patent referred to, for the purpose of rotating the type-wheel to properly present the letter or other character for printing, and then to vibrate the wheel to produce the impression; but in lieu of the ratchet-wheel on the type-wheel shaft and the rigid stop-pawl on the rear comb, as shown in the patent referred to, for rigidly securing the type-wheel against any advance or retrograde movement during the act of impressing the letter or character

upon the paper on the carriage I give to the sectors A, which operate the type-wheel, and the sector D, which meshes with the teeth *a* on the short arm of the pawl E, which in turn arrests and holds the heart-shaped ratchet F, a different radius, the sector D having a longer radius than the sector A, which induces to the pawl E being first moved downwardly sufficiently far to contact with the teeth on the heart-shaped ratchet F to arrest its rotary movement at the proper time to present the desired letter or character on the type-wheel in position for impression upon the paper and then and in advance of the vibration of the type-wheel shaft to move into a slot or notch below the arresting-tooth of the ratchet F to firmly lock the latter against rotary movement in either direction, which locking action is supplemented by the ratchet-wheel F in its downward or vibratory movement seating itself over a vibratory spring-pawl *b*, pivoted in ears extending downwardly from the sector-shaft G.

The peculiar construction of the teeth and locking-notches of the ratchet-wheel F is most clearly illustrated at Figs. 26 and 27, and the differentiality in the pitch-line of the gears of the sectors A and the sector D and the corresponding gears on the segmental racks H, which vibrate the type-wheel shaft, and the gear or teeth *a* on the locking-pawl E is best shown in Fig. 5 by solid and dotted lines, and also at Fig. 28, where it will be seen that the sector D extends slightly above the plane of action of the sectors A and that teeth or gears *a* on the pawl on the short arm of pawl E are slightly above the gears or teeth by which the segmental racks H are operated through the medium of the sectors A, and as a result of this arrangement when either of the sectors A is vibrated by the initial depression of any key-lever the first effect is to rotate the type-wheel in the manner described in my patent herein referred to, and the further depression of the key-lever then causes the type-wheel shaft to vibrate and bring the desired letter or character on the type-wheel in contact with the paper on the carriage and at the same time causes the sector D to vibrate upon its axis, so that one of the sectors A and the sector D are both vibrating at the same time upon a common axis, and owing to the differentiality in the pitch-line of the respective gears hereinbefore explained the pawl E is first vibrated sufficiently far to contact with a tooth on the ratchet-wheel F and then to descend rapidly (or with accelerated speed) into the square seat *c* in said ratchet-wheel and before the latter has been vibrated sufficiently far to impress the letter or character upon the paper. As the type-wheel progresses in vibratory movement after the pawl E has been securely located and before the impression is made on the paper the ratchet-wheel contacts with the vibrating spring-pawl *b*, which seats itself in one of the square seats *c* diametrically opposite to the seat of the

pawl E, and hence the type-wheel is securely locked in position to secure proper and accurate impression of the desired letter or character upon the paper, and in order that the lower pawl *b* shall be free to move with the vibrations of the type-wheel and at the same time remain in its seat within the ratchet-wheel it is connected with the head-casting I of the frame by a spiral spring *d* and the swinging upper locking-pawl E is returned to its normal position by a spiral spring *e*. By this construction I am enabled to entirely dispense with the secondary ratchet-wheel on the type-wheel shaft and the stationary locking-pawl on the rear comb, as shown in my Letters Patent hereinbefore referred to.

I will now proceed to describe the means by which I am enabled to secure a double feed and space after the terminal letter of any given word and before the impression of the initial letter of the next word, and in describing the mechanism by which this result is attained especial reference is made to Figs. 4, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, and 23.

J is a reciprocating feed-plate, such as shown and described in my Letters Patent referred to. Rising from said plate is a vertical post K with a curved knee at the rear and extending upwardly and toward the keyboard, as shown at Figs. 17 and 18, and to which is pivoted by a screw L a rocking bell-crank lever M of the form shown particularly at Fig. 20, the lower end of which is formed with a right-angled projection or finger N, adapted to contact with the lower end of a bell-crank lever O, pivoted at P to the spacing-bar lever Q. (See Fig. 17.) The upper end of this lever O rests upon the top edge of a vertically-adjustable plate R, pivotally secured at *f* to the front face of the front comb-plate S and held in adjustment by a set-screw *g*, from which construction it will be seen that as the spacing-bar lever Q is depressed the bell-crank lever O, pivoted thereto, must of necessity rock upon its pivot P, and as the upper end of said lever is in contact with the adjustable plate R the lower end of the lever swings toward the front of the machine and, bearing against the projection or finger N at the lower end of the lever M, pulls the latter toward the operator, because the upper end of this lever M rests upon and is supported by a pin or stud T⁵, projecting from a downwardly-extended arm of the type-wheel mechanism, (see Figs. 19 and 24,) and consequently the arm K and feed-plate J, to which it is secured, are also drawn forward sufficiently far to produce a feed equal to one space. This action is accomplished through the medium of the feed pawl or dog T, pivoted at U to a bell-crank lever V, pivoted at W to the bed-plate X of the machine. This lever V is formed with a hook *h*, which embraces a diagonal wicket *i*, secured to the rear end of the feed-plate J, and consequently as the feed-plate is reciprocated toward the operator the lever V is vibrated upon its pivot W and the

toe *j* forces the dog T out of contact with the rack Y of the paper-carriage and backward a distance equal to the feed to be made, as shown in dotted lines at Fig. 12, the spiral spring *b'* holding the dog in contact with the rack, and as the feed-tension spring Z (see Fig. 11) returns the feed-plate J to its normal position the wicket *i* returns the bell-crank lever V, and thus advances the paper-carriage rack a predetermined distance, and the latter is arrested and held firmly by reason of the inclined edge of the dog T wedging against an inclined stop A', secured to the bed-plate X, and any accidental retrograde movement of the carriage-rack is prevented by a spring-dog bar B'.

Having described how a regular feed is accomplished by the spacing-bar C' with its lever Q, I will now explain how the feed is accomplished by the depression of the individual key-levers D'.

The key-levers vibrate the bails E' F', (see Fig. 28,) which are substantially like those described in my Letters Patent hereinbefore referred to, the sectors A being secured to the bail F' and the sector D' to the bail E'. The sector D has secured to it a plate G', which extends laterally and constitutes a bridge over the rear edges of the sectors A, and through the medium of set-screws and jam-nuts (shown at H', Fig. 28) the sectors A and D are adjusted in proper relation to each other. As the sectors are vibrated by the action of the front bail E' and the type-wheel is forced down to impress a letter upon the paper the pin or stud T⁵ on the type-wheel mechanism vibrates against the rear edge of the upper arm of the bell-crank lever M, and as the finger or projection N on its lower end is in contact with the lower end of the bell-crank lever O it is held against vibration and is caused to move bodily toward the operator and being pivotally secured at L to the rigid post K, secured to the feed-plate, the latter is caused to move toward the operator a distance sufficient to release the feed-dog T and move it longitudinally a distance sufficient to produce the proper feed, which is accomplished through the medium of the bell-crank lever V and its connection with the dog T and wicket *i* on feed-plate J, as already described with reference to the feed-space, and as the feed-plate J is reciprocated by the bodily movement of the post K, the latter is in both cases acted upon by the pivoted bell-crank lever M, and after the post K has been moved by the lever M through the action of the key-lever, the finger or projection N on lever M being still in contact with the lower end of the bell-crank lever O, the depression of the spacing-bar C' and its lever Q will cause the lower end of lever O to travel toward the operator a distance commensurate with one feed distance, so that by striking the final letter of any word and the spacing-bar simultaneously the feed-dog is moved backward a distance equal to two feed-spaces

in the carriage-rack when the letter is impressed on the paper, and when the tension-spring forces the feed-plate J rearward after pressure is removed from the key and spacing-bar the wicket *i* causes the lever V to vibrate on its pivot and to push the feed-dog T in the direction of the feed, or, in other words, when a key-lever is depressed the lower arm of the lever M is held rigidly by the contact with the lower end of lever O, and the stud T^x on the type-wheel mechanism, bearing against the upper arm of lever M, moves the same and its connections bodily, and when the spacing-bar lever is depressed the contact of the levers O and M at the bottom and the contact of the rear edge of the upper arm of lever M with the stud T^x causes the lever M and feed-plate to also move bodily, so that while the actions of the key-levers and the spacing-bar lever are independent of each other for single feeding the changed position of the stud T by the key-feed enables the spacing-bar lever to begin its action at a different point when the final letter of a word and the space-bar are struck at the same time, thus resulting in a very material saving of time in printing.

I will now proceed to describe the construction and arrangement of the alarm mechanism, referring more particularly to Figs. 3, 4, 5, 6, 7, 8, and 30 of the drawings:

In my Letters Patent herein referred to the bell is arranged in a fixed position on the paper-carriage and is struck always at the same time and locality by a tappet. In my present improved construction I secure through the radial arms extending from the paper-carriage at each end a square or multifaced rod J', upon which is arranged a sliding yoke K', to the advance or front end of which is pivoted an arm L', carrying at its outer end the bell M', and its inner end having a stop to contact with the under face of the rod J', so that the bell may be held in operative position or turned upwardly, as shown in dotted lines, when the machine is to be placed in its cover. (See Fig. 30.) The tappet N', which strikes the bell, is secured to the vibrating ink-roller frame O' by a spring-wire P', and as the type-wheel B contacts with the inking-roller Q² the tappet is thrown against the bell when it reaches a point in alinement with said tappet, and as the yoke K' is adjustable on the rod J' it is obvious that it can be arranged to give the alarm at the end of a line of any desired length. Not only can the alarm be given at any desired locality with the usual allowance of two or three additional type impressions, but I provide mechanism by which when the proper limit of impressions has been made the type-cylinder and its mechanism become positively locked, so that even though the operator fails to heed the alarm-signal his work will not be mutilated. This locking mechanism consists of a secondary sliding spring-yoke R', shorter than the yoke K' and arranged on the opposite side of the rod J'

and between the ends of the yoke K', with a spiral spring S' at one end, as shown. The upper edge of this secondary yoke is formed with an inclined lip and shoulder T', adapted to contact with the outer edge of a thin flat bar U', (see Fig. 8,) pivoted to the flat metal paper holder or guide V'. This bar U' is formed at the rear end with a latch-shoulder *l*, adapted to interlock with the rod or arm W', extending radially from a collar secured adjustably to the type-wheel mechanism, as clearly shown at Fig. 26. The radial arm W' has connected therewith one end of a coil tension-spring X', (see Fig. 3,) which has its other end attached to the lower end of a bell-crank Y', pivoted between lugs *m*, projecting from the cast-metal head Z'. The upper end of the bell-crank Y' is formed with an inclined face, against which the lower end of an adjusting-screw *1* contacts, and whereby the spring X' may have its tension controlled in an obvious manner for controlling the return of the type-wheel mechanism to its normal position after every impression made by it upon the paper on the carriage. On each return of the type-cylinder the radial arm W' travels to a position in rear of the shoulder *l* of the latch-bar, and when the shoulder T' on the secondary bell-yoke R' contacts with the outer edge of the flat latch-bar U' it causes said bar to vibrate upon its pivot *n*, and in doing so the shoulder *l* travels behind the radial arm W' on the yoke-frame and intersects the path of movement of said radial bar, so that the latter is arrested by the said shoulder *l*, and consequently the complete vibration of the yoke-frame (which is necessary to produce an impression upon the paper) is arrested or locked before the type-cylinder reaches the paper, and hence no impression can be made. The short spiral spring S' between the ends of the bell-yokes K' and R' yields slightly as the feed of the carriage takes place and then reacts with greater celerity than the movement of the paper-carriage and causes a prompt action of the pivoted latch-bar U'. If for any reason it should be desirable to print a limited number of letters after the type-wheel has been locked against descent, the latch-bar can be released by lifting the outer end *o* sufficiently to permit the inclined lip or shoulder T' on the secondary bell-yoke R' to pass under the said bar when the latter, under the action of a small spiral spring extending from the heel *p'* of the latch-bar to the point *q'* on the paper-holder V', will return to its normal position. On the return movement of the paper-carriage the incline of the lip T' rides under the bar U' freely. Arranged in any suitable manner between the yoke K' and its supporting-bar J' is a flat spring *r'*, which produces sufficient friction between the yoke and rod to maintain them in any adjusted relation.

I will now proceed to describe the automatic pointer, which indicates the locality on the sheet of paper at which each successive

letter will be impressed and which is employed particularly in correcting misprints or filling in omitted letters. In describing its construction and operation reference is especially made to Figs. 2, 6, 9, 10, and 26.

The pointer is indicated by the numeral 2 and is of the form shown at Fig. 9, with its rear or exposed portion curved and its extreme end cut off on a straight line to constitute an exact indicator. It is pivoted at 3 to an adjustable sheet-metal support 4, Fig. 10, which is attached to the rear edge of one of the lateral branches of the cast-metal head Z' by set-screws 5 5, passing through slots 6 6. The support is constructed, as shown at Fig. 10, with a flat support to constitute the pivotal connection 3 with the pointer and with a curved portion 7, turned down vertically and formed with a step or shoulder 8 to arrest and hold the pointer 2 in proper position to indicate the locality of a letter when the type-wheel rises to its normal position. This position and relation of parts may be secured with absolute accuracy through the medium of the set-screws 5 5 and slots 6 6 in the support 4. A suitable coil-spring 9, having one end secured at 10 to the pointer and the opposite end at 11 to the support, will return the pointer to position against the stop 8. When the type-wheel descends to impress any desired character upon the paper, the pointer is moved out of the way by a radial pin 12, which projects vertically from a collar 13, secured adjustably to the shaft G of the type-wheel mechanism. (See Fig. 26.) As the radial pin 12 vibrates with the rock of the shaft G it comes in contact with the inclined edge 15 of the pointer 2 and vibrates the same upon its pivot 3 in an obvious manner toward the left of the machine and entirely out of the way of the type-wheel, and when the latter is lifted by its tension mechanism the pin 12, reversing its movement, leaves the spring 9 free to return the pointer to its proper indicating position.

Referring now particularly to Fig. 31, I will describe my improved mechanism, by means of which I am enabled to rotate the paper-roll of the carriage and at the same time release the feed, so that the paper-carriage is capable of any adjustment longitudinally and rotatively which may be desired. I have omitted this feature of construction in all other figures of the drawings simply to avoid confusion of lines.

On the shaft of the paper-carriage and at the right-hand end are arranged the thumb-piece A^2 and ratchet mechanism substantially such as shown and described in my Letters Patent herein referred to and by means of which the paper-roll is rotated. In addition to this mechanism I arrange upon the shaft of the paper-roll a diametric vibratory arm B^2 , with a thumb-piece C^2 and with a toe D^2 adapted to contact with the usual thumb-piece A^2 . The lower or opposite end of the arm B^2 is connected by an ordinary screw

through a slot E^2 to a link F^2 , the rear end of which is slotted and receives the feed-releasing bail G'' , which is the same in all respects as that shown in my Letters Patent referred to. As the link F^2 is slotted at both ends, it will be seen that the feed-releasing bail G^2 is free to be operated in the usual way without in any manner interfering with the arm B^2 ; but when the thumb-piece C^2 and scale-support H^2 , to be hereinafter described, are bridged by the thumb and finger of the operator and pressure applied the thumb-piece C^2 will travel toward the thumb-piece A^2 until the toe D^2 contacts with the thumb-piece A^2 and then both thumb-pieces A^2 C^2 will travel together rearward, which action will cause the pawl-and-ratchet mechanism to rotate the paper-roll (shown in dotted lines at Fig. 31) and at the same time draw the link F^2 toward the operator, and as the rear end of said link surrounds the feed-releasing bail G^2 it will also travel in the same direction and release the feed, so that the paper-carriage may be returned toward the right-hand side of the machine.

I will now refer to another feature of my invention in connection with the feed mechanism. It being understood that my feed-power is always created and stored up by the act of depressing the keys or spacer-bar, it follows that when either the key or spacer-bar is released the stored power will immediately exert itself to propel or feed the paper-carriage. It frequently happens that after a letter has been printed or ineffectually attempted it is desirable to have the paper-carriage remain stationary for a reprint or correction, and to accomplish this result I pivotally attach to the left-hand side of the frame a retaining bar or lever I^2 , (see Fig. 32,) with a horizontal finger-piece or key J^2 at the front end and with its lower extreme end slightly beveled and adapted to contact with the edge of the feed-rack Y of the paper-carriage or with any other suitably-presented portion of the feed-rack, so that when the key J^2 is depressed a sufficient frictional contact is effected to suspend the action of the feed mechanism, and as soon as the pressure is relieved from the key J^2 the feed takes place in the usual manner.

Another detail of improvement is shown in Figs. 2, 33, and 34, in which K^2 represents the usual longitudinally-adjustable rod adapted to contact with any suitable shoulder or stop K^3 on the bed-plate of the machine, and thus secure any desired margin upon the printed sheet. My improvement in relation to this stop-rod consists in securing it within a sleeve or bearing on the outer end of a swinging arm L^2 , which is pivoted or hinged at M^2 to lugs N^2 on the end of the feed-rack Y, so that when it is desired to entirely remove the feed-rack and paper-carriage from the machine the rod K^2 and arm L^2 are lifted upwardly and the inner free end of the rod is pushed over a stationary pin or support O^2 on the feed-rack

above the top plane of the shoulder or stop K^3 on the bed-plate, thus holding the rod K^2 in a position above the stop K^3 , so that as the paper-carriage and feed-rack travel to the right the rod L^2 will not contact with the shoulder K^3 , and when the feed-rack and paper-carriage are in position on the machine the rod K^2 is withdrawn from the support and properly adjusted with reference to any desired margin and is held by gravity in such position, the lower edge of the arm L^2 contacting with the upper surface of the feed-bar Y .

Referring now to Figs. 1 and 2, I will describe details of improvement in the scale index-bar and its connections. P^2 are two flat metal arms or supports having their lower ends returned to embrace the bell bar or rod J' , over the ends of which the said supports are slipped and held by frictional contact. The upper portions of the arms P^2 are curved and terminate in vertical flat faces, as shown particularly at Fig. 1, and are provided with button-studs adapted to interlock with buttonhole-slots S^2 in the ends of the scale index-bar T^2 . From this construction it will be seen that the arms P^2 may be sufficiently sprung toward each other to permit the index scale-bar to be readily released from the studs R^2 and that the arms may also be readily removed from the ends of the bell-bar J' in order that the latter may be removed, when desired, from its bearings or when it may be necessary or desirable to remove the adjustable bell-supporting yoke thereon. Recurring again to the pawls E and b , which are employed to securely lock the type-wheel against rotation, I call attention to the fact that I provide an adjustable set-screw U^2 , which arrests the return of the pawl E , and a longer set-screw V^2 , which holds the pawl b away from the type-wheel ratchet F and against the tension of the spring d , so that both of the pawls may be caused to act at the proper time to secure the best results.

It will be observed that the spacing-bar is continuous and surrounds the entire keyboard. This gives a pleasing design to the entire machine and also presents the spacing-bar in such position that it can be depressed at the same time that any one of the keys in the keyboard is struck, when it is desired to accomplish the double spacing.

Having described the construction and operation of my improvements, what I claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine of the character described the combination of the ratchet-wheel F on the vibrating type-wheel shaft, provided with teeth a and pawl-seats c , means for rotating the type-wheel and ratchet, pawls E and b for arresting and holding the type-wheel, the sectors A and D with varying pitch-lines, and gears of corresponding variance in pitch-line on the wheel-rotating mechanism and on the pawl E , whereby the pawl E is first

advanced in position to stop the rotation of the type-wheel and then advanced with accelerated speed into its seat c in the ratchet-wheel before the type-wheel is impressed against the paper upon the carriage, substantially as hereinbefore set forth.

2. The combination with the feed-bar J , feed-rack Y of paper-carriage, bell-crank lever V , dogs B' , T , the post K secured to the feed-bar, bell-crank lever O pivoted to the space-bar lever, and plate R on front comb of the machine, the spacing-bar and key-levers and vibrating stud T^5 attached to the vibrating type-wheel mechanism, whereby a single feed may be secured by the depression of either the spacing-bar lever or any one of the key-levers, or a double feed secured by the simultaneous depression of any one of the key-levers and the spacing-bar lever, as hereinbefore set forth.

3. In combination, with the spacing-bar lever and the key-levers, feed-rack on the paper-carriage and a feed-dog interlocking with the feed-rack and adapted to reciprocate, mechanism intermediate of said dog and the spacing-bar and the key-levers for reciprocating the feed-dog distances as described to secure a single or double space feed, as and for the purpose hereinbefore set forth.

4. In combination with the feed-plate J provided with the wicket i and tension-spring Z , the feed-rack Y and feed-dog T , the bell-crank lever V pivoted to the bed-plate and feed-dog, and with spring connection k , and connected with the wicket i by the hook h , substantially as and for the purpose set forth.

5. In combination with the paper-carriage of a type-writer, and means for vibrating a bell-sounder each time a letter or other character is printed, a bell adjustably secured to the paper-carriage whereby an alarm may be sounded at the termination of any predetermined point in the travel of the paper-carriage, substantially as hereinbefore set forth.

6. In combination with the paper-carriage, a multifaced bar J' , a sliding bell-yoke K' , a bell M' , and bell-arm L' pivotally attached to the yoke and provided with a step or notch to contact with the bell-bar J' , substantially as and for the purpose set forth.

7. In combination with the type-wheel vibrating mechanism, the radial arm W' on the rocking shaft 14 and the bell on the paper-carriage, a vibratory spring latch-bar U' , adapted to interlock with the radial arm W' and means substantially as described for operating the latch-bar whereby the type-wheel is locked against vibration, substantially as hereinbefore set forth.

8. In combination with the latch U' , bell-bar J' , and yoke K' on the bell-bar, the secondary yoke R' with lip or shoulder T' and the coil-spring S' between the end of yoke R' and the end of yoke K' , whereby accelerated movement is given to the yoke R' after the shoulder T' contacts with latch-bar substantially as and for the purpose set forth.

9. In combination with the paper-carriage, and a printing mechanism provided with a radial vibrating stud or arm 12, a pointer 2 provided with an inclined or cam face 15 and
5 pivoted to an adjustable plate 4 having a stop or shoulder 8 thereon, whereby the pointer is swung out of the way of the type-wheel and returns to its normal position, substantially as and for the purpose set forth.

10. In combination with the paper-carriage provided with a thumb-piece A² and mechanism for rotating the paper carriage or roll, the index-scale support H² and feed-releasing bail G², the diametric arm B² provided with
15 thumb-piece C² and toe D² mounted upon the shaft of the paper-roll and connected by a slotted link F² with the feed-releasing bail G² whereby the paper-roll may be rotated and the feed released simultaneously as herein-
20 before set forth.

11. In combination, with the frame of the machine, and the paper-carriage and feed mechanism, the pivoted retaining-bar I² having its rear end beveled and adapted to contact with the paper-carriage, whereby the feed
25 of the paper-carriage may be suspended, as and for the purpose set forth.

12. In combination with the paper-carriage provided with support O², and the frame of the machine, the stop-bar K² connected with
30 a vibrating arm L² pivoted to lugs N² on the feed-rack plate, substantially as and for the purpose set forth.

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

GEO. C. BLICKENSDERFER.

Witnesses:

CHAS. S. HINE,
HERVEY SMITH.