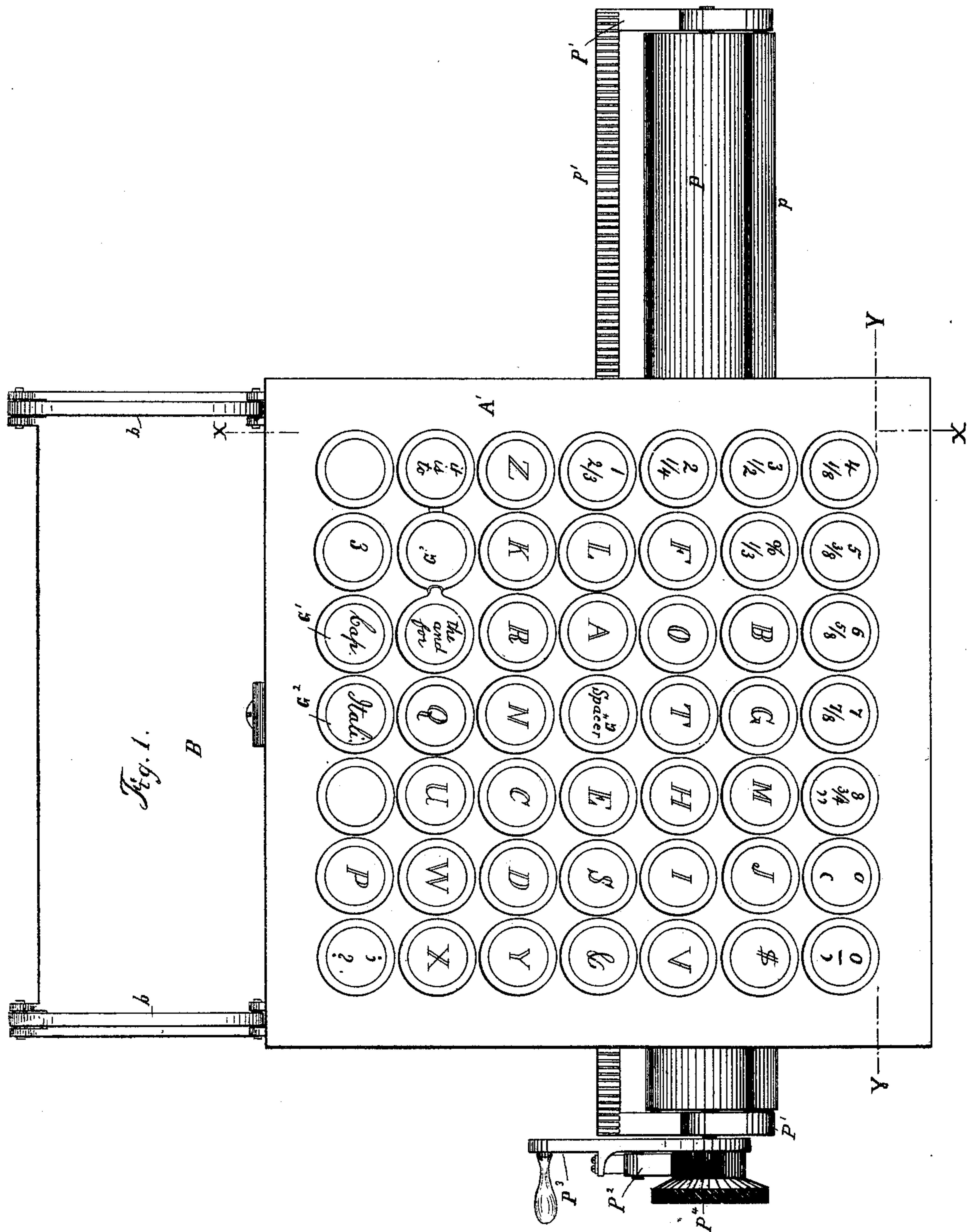


4 Sheets—Sheet 1.

No. 410,662.

Patented Sept. 10, 1889.



Inventor.  
Geo. B. Flickensolver  
Per. Nallock & Hallack



(No Model.)

4 Sheets—Sheet 2.

G. C. BLICKENSDEKFER.  
TYPE WRITING MACHINE.

No. 410,662.

Patented Sept. 10, 1889.

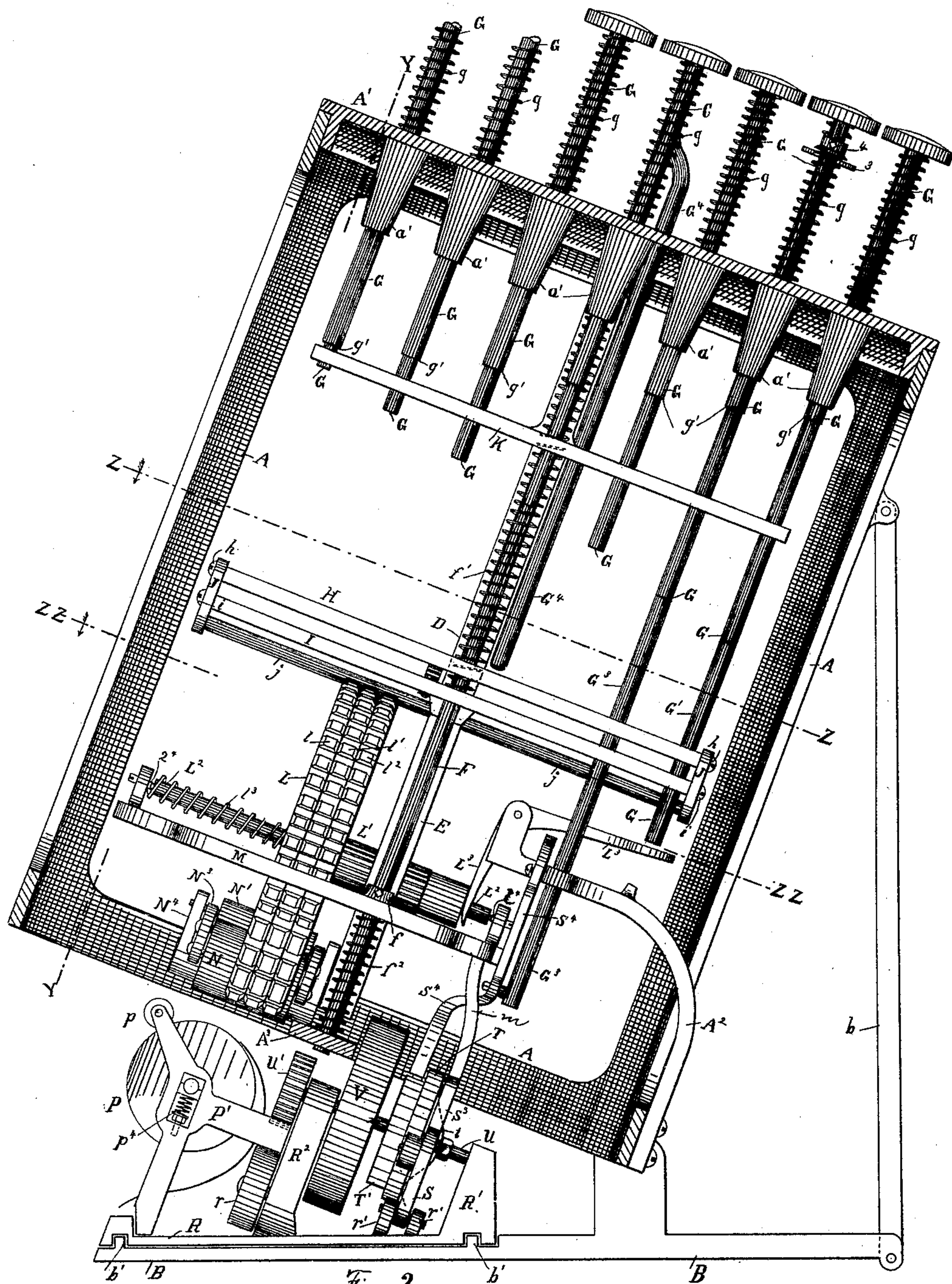


Fig. 2

Witnesses.

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Inventor.

Geo. C. Blickensderfer

Per. Hallowell & Hallowell

Att's



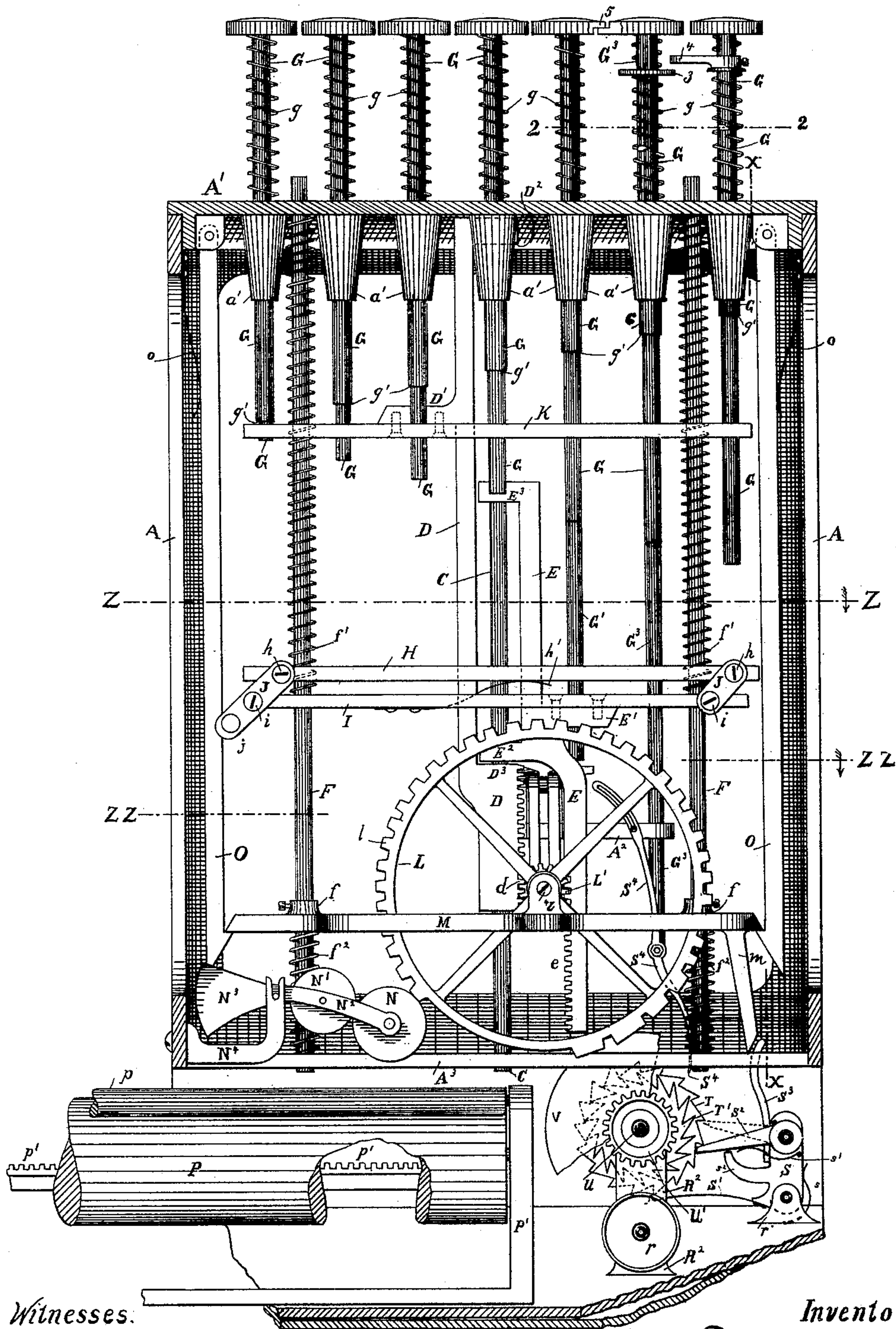
(No Model.)

4 Sheets—Sheet 3.

G. C. BLICKENSDEFFER.  
TYPE WRITING MACHINE.

No. 410,662.

Patented Sept. 10, 1889.



Witnesses:  
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Fig. 3

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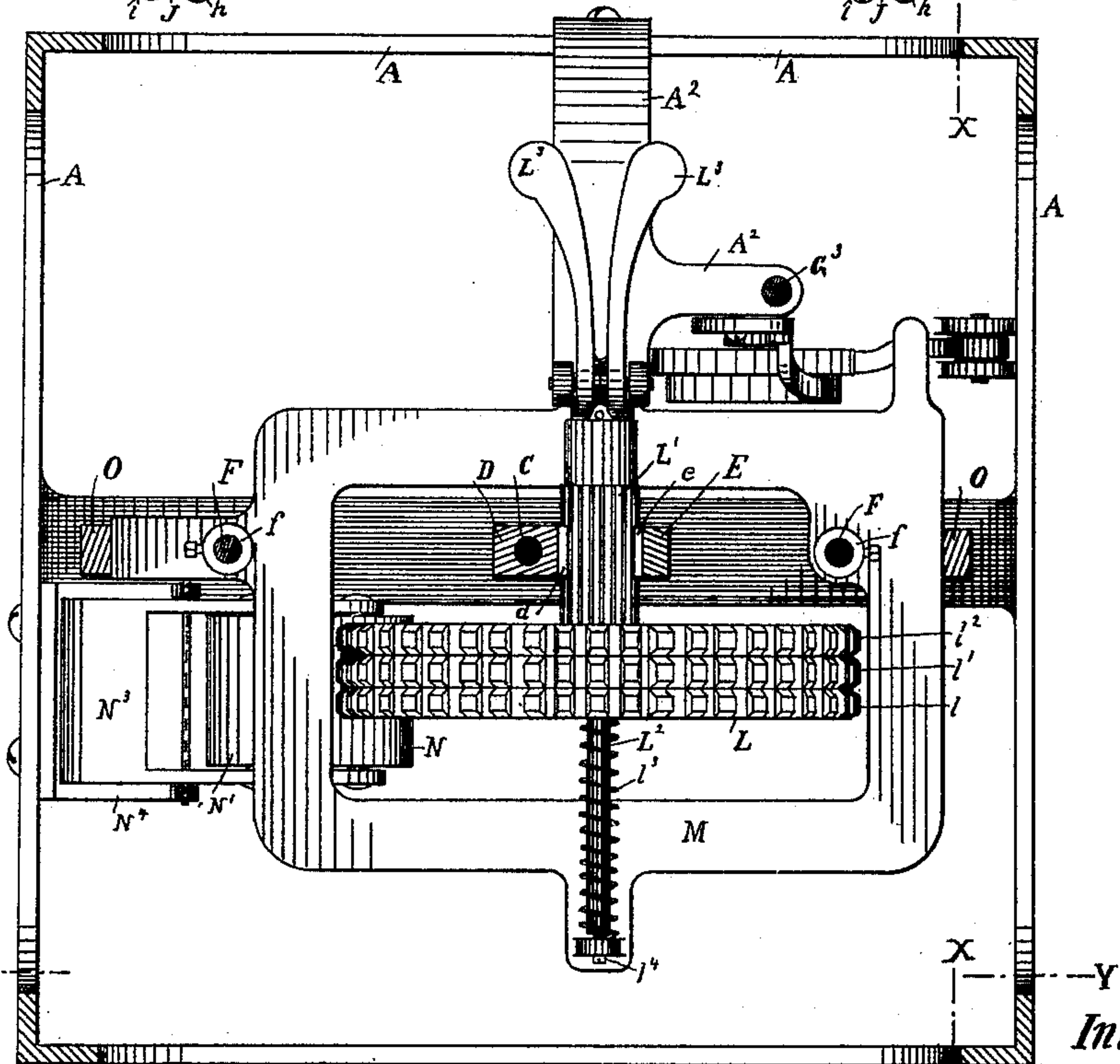
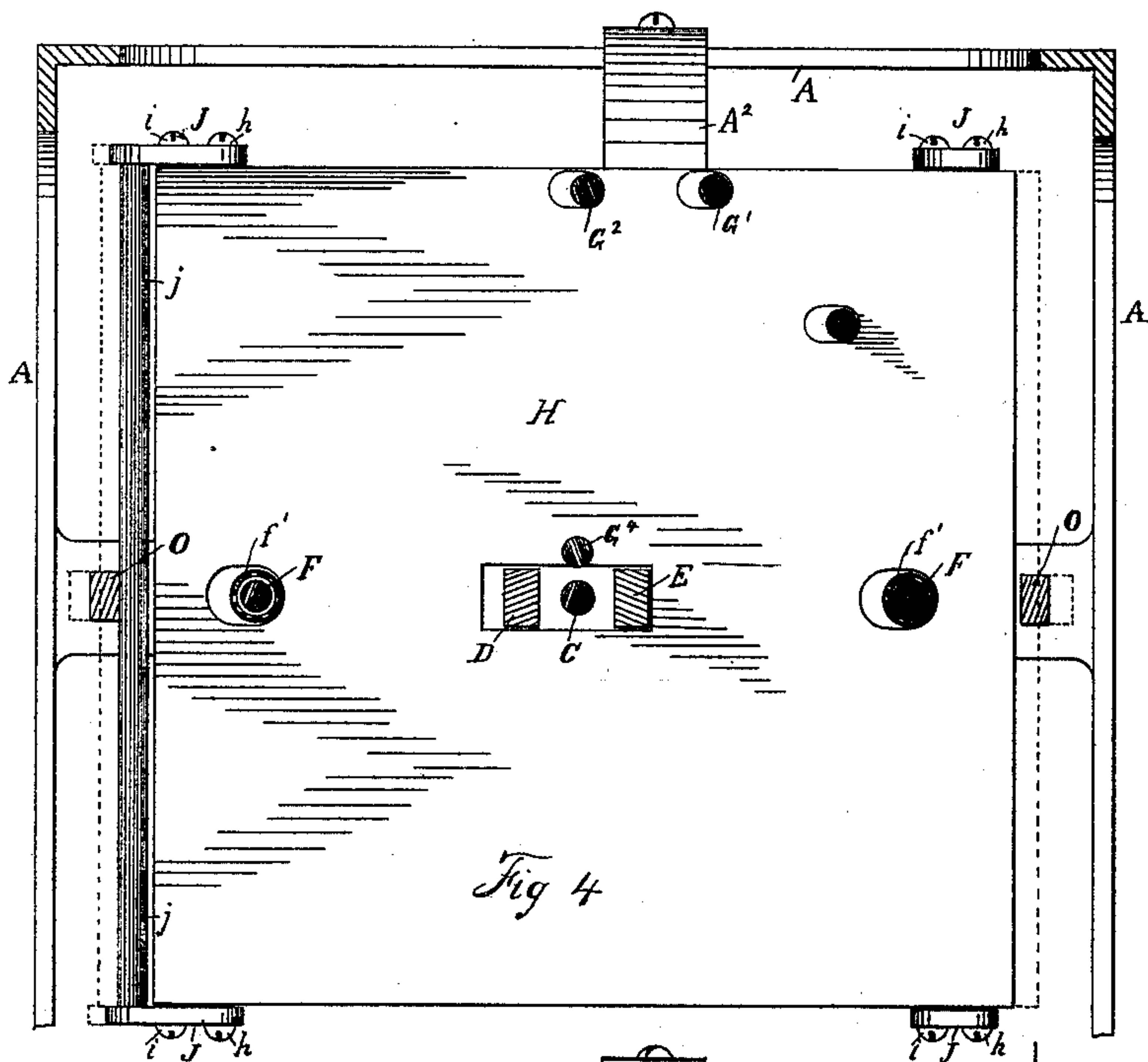
(No Model.)

4 Sheets—Sheet 4.

G. C. BLICKENS DERFER.  
TYPE WRITING MACHINE.

No. 410,662.

Patented Sept. 10, 1889.



*Witnesses.*

L. D. Hanford

R. N. Porter,

*Fig. 5*

Geo. C. Blickensderfen

Per. *Hallmark & Muller*

Att's



# UNITED STATES PATENT OFFICE.

GEORGE C. BLICKENS DERFER, OF ERIE, PENNSYLVANIA, ASSIGNOR TO THE  
BLICKENS DERFER MANUFACTURING COMPANY, OF NEW YORK, N. Y.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 410,662, dated September 10, 1889.

Application filed January 13, 1887. Serial No. 224,246. (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 Erie, in the county of Erie and State of  
5 Pennsylvania, have invented certain new and  
useful Improvements in Type-Writing Ma-  
chines; and I do hereby declare the following  
to be a full, clear, and exact description of the  
invention, such as will enable others skilled  
10 in the art to which it appertains to make and  
use the same.

This invention relates to type-writing ma-  
chines; and it consists in certain new and use-  
ful improvements in the construction thereof,  
15 as will be hereinafter described, and pointed  
out in the claims.

My invention is illustrated in the accom-  
panying drawings as follows: Figure 1 is a  
top or plan view, the top of the drawing be-  
ing the operator's side. Fig. 2 is a vertical  
20 sectional view taken on the line  $xx$  in Figs.  
1, 3, and 5. Fig. 3 is a vertical sectional view  
taken on the line  $yy$  in Figs. 1, 2, and 5. Fig.  
4 is a horizontal sectional view taken on the  
line  $zz$  in Figs. 2 and 3. Fig. 5 is a horizon-  
25 tal view taken on the line  $zzzz$  in Figs. 2  
and 3.

In Figs. 1 and 2 the paper-carriage is shown  
in the position it occupies when the machine  
30 is operating upon it, and in Fig. 3 it is shown  
drawn out to one side, so as to show construc-  
tion of parts beyond, and in Figs. 4 and 5 the  
carriage is not shown. In Figs. 2 and 3 the  
section-lines pass through the frame-work  
35 only, leaving the working parts in elevation.  
The frame-work is nearly conical in form, be-  
ing rectangular and somewhat higher than it  
is wide or deep. It is made of iron or other  
metal, and consists of the upright open frame  
40 A, the lower cross-stay  $A^3$ , the top plate  $A'$ ,  
and the inwardly-reaching arm  $A^2$ . This  
frame-work sits on a base-piece B in an in-  
clined position, as shown in Fig. 2, and is sup-  
ported by props  $b b$ .

45 The key-board is on the top plate  $A'$ , and  
all the mechanism for operating the type-  
wheel is adjusted in the frame-work  $A A'$   
 $A^2 A^3$ .

50 The paper-carriage and its feed-works are  
mounted on a second carriage or sliding base-  
piece R, which is mounted on guides  $b' b'$  on

the base-piece B. The mechanism for actu-  
ating the feed-works is adjusted in the frame-  
work A,  $A'$ ,  $A^2$ , and  $A^3$ .

As illustrated, the machine is constructed 55  
so as to print direct from the type, an inking  
device  $N N' N^2 N^3 N^4$  being shown; but if it is  
desired to print by the use of an inked ribbon  
no change in the general construction is re-  
quired. The type-wheel face would be made 60  
of proper material, and the inking apparatus  
would be dispensed with.

The paper-carriage consists of a frame  $P'$ ,  
having therein a roller P, substantially the  
same as in other type-writers. There is a 65  
rack  $p'$  on the frame supported by roller  $r$   
and carrying the roller P, which gears with a  
pinion  $U'$  on the feeding-shaft U, journaled  
upon the standards  $R' R^2$ . The roller P can  
be revolved to draw in a new sheet by a hand- 70  
wheel  $P^4$ , and it is moved by a clutch and  
lever  $P^2 P^3$  to space the lines. The paper-  
carriage can be drawn out at any time to see  
the work and then shoved in again. The car-  
riage is moved after each impression and to 75  
space between words by the pinion  $U'$  acting  
upon the rack  $p'$  on the carriage. The pin-  
ion  $U'$  is operated by a coiled spring in the  
case V on the shaft U, and the action of the  
spring is regulated by an escapement device 80  
which is operated from the printing mech-  
anism, as will be explained in proper place.  
This shaft and pinion U  $U'$  is also operated  
by a direct-acting pawl-and-ratchet device,  
which is operated from a special key  $G^3$  in 85  
the key-board, as will be hereinafter ex-  
plained.

The escapement device consists of the  
ratchet T, rocker S, pivoted upon standards  
 $r' r'$ , and pawls  $S' S^2$ . The pawl  $S'$  is a spring 90  
and acts as a hook-pawl. The pawl  $S^2$  is acted  
upon by a spring  $s'$ , and the rocker S is oper-  
ated upon by a spring  $s$ . The rocker is moved  
by a lever  $S^3$ , which is moved by an arm  $m$  on  
the frame M when that frame is pushed down, 95  
which occurs when an impression is made.  
The action of these parts is as follows: The  
arm  $m$  throws the rocker S back, which draws  
the pawl  $S^2$  back and pushes the pawl  $S'$  up-  
ward. When the pawl  $S^2$  is drawn back, it is 100  
free to fly up by the action of the spring  $s'$   
into the position shown by dotted lines in



Fig. 3, where it is in position to engage the ratchet T. When the plate M moves up, the spring *s* throws the rocker upward and the pawl *S'* is disengaged. The spring in the case V then acts and drives the ratchet against the pawl *S*<sup>2</sup>, pushes back the rocker, and carries the pawl *S*<sup>2</sup> down until it is stopped by the horn *S*<sup>2</sup> in the position shown in full lines.

The ratchet T is not fixed to the shaft U; but the ratchet T' is, and the ratchet T is kept in frictional contact with the ratchet T' by a spring *t*, (see Fig. 2;) hence the shaft U may be revolved without revolving the ratchet T, and so the carriage may be moved by acting upon the ratchet T' without disturbing the escapement.

The ratchet T' is acted upon by a pawl *S*<sup>4</sup>, which is acted upon by the key *G*<sup>3</sup>. The object of this pawl and ratchet is to feed the carriage forward a proper distance when type having two or three letters are brought into action, as will be explained farther on; or the device may be used to space between words or sentences.

The type-wheel L is mounted on the frame or plate M and mounted so as to slide on its shaft L<sup>2</sup> by the use of a spline and groove or other like means. Its hub L' is an elongated spur-gear, which engages with vertical racks D and E.

The means for sliding the wheel on its shaft are the levers L<sup>3</sup> and the keys *G'* *G*<sup>2</sup>. These keys and levers are so graduated that one key will move the wheel on its shaft twice as far as the other key. The wheel is reacted on the shaft by the spring *l*<sup>3</sup>. The face of the wheel is divided into three spaces, so that three rows of type may be placed around it, and the object in making the wheel movable longitudinally on its shaft is to bring either of these rows of type into action. I am aware that type-wheels have been made with two or more rows of type and moved so as to bring either row into action, and I shall not claim this feature broadly.

The shaft of the type-wheel is journaled on pin-points *l*<sup>4</sup> *l*<sup>4</sup>.

The plate or frame M is attached to the two rods F F, which work through the base-piece A<sup>3</sup> and the top plate A', by set-screws in the bosses *f* *f*, and it is supported by springs *f*<sup>2</sup> *f*<sup>2</sup>. This plate or frame is held against downward movement until the proper time by swinging catch-bars O O, (see Fig. 3,) which are disengaged at the proper time by means hereinafter to be explained.

The means for rotating the type-wheel to the desired point and making the impression are as follows:

D is a rack-bar having a rack-gear *d*, which engages with the spur-gear L' on the wheel L. This rack-bar D is guided at its top and bottom at D<sup>2</sup> and D<sup>3</sup> on an upright bar C, which extends from the base-piece A<sup>3</sup> to the top plate A'. Near the top of the rack-bar D is an arm D' extending from it, and on this is

secured a plate K, which lies parallel with the top plate A'.

G G are the keys, which are adjusted in sleeves *a'* on the plate A' and are supported by springs *g*. These keys G are shouldered at *g'* and pass through the plate K. No two keys are of the same length, and no two have their shoulders *g'* the same distance from their lower ends. As any one key is depressed, its shoulder *g'* will engage the plate K and move it down; hence each key will carry down the plate K a different distance from that which any of the other keys will carry it down when fully depressed. As the depression of the plate K moves the rack-bar D down, the type-wheel L is revolved more or less, according to the distance the plate K is depressed.

E is a second rack-bar having a rack *e*, which engages the spur-gear L' on the opposite side from the rack *d*. This rack-bar is guided at E<sup>2</sup> and E<sup>3</sup> on the upright bar C, and it moves simultaneously with the rack-bar D, but in an opposite direction.

On the rack-bar E there is an arm E', and a plate I is attached thereto, so as to lie parallel with the plate K. This plate I is guided by the rods F F, and springs *f'* *f'* on said rods oppose its upward movement and serve to react it.

It will be seen now that on the depression of any type-key the plates K and I approach each other more or less, according to which key is depressed, and are arrested by the end of the key coming in contact with the plate H, and when the pressure on the keys is removed the springs *f'* *f'* will react the plates to their normal positions, and the type-wheel will have been revolved more or less, according to which key is depressed.

A third plate H is supported above and parallel to the plate I by parallel links J and a spring *h'*. The upper face of this plate is seen in Fig. 4, where it will be seen that the openings through it are slotted, so that the plate H may move sidewise as it moves vertically independently of the plate I, to which it is hung by the links J. It will be seen in Fig. 3 that the links J on the left are projected below the plate I, and in Fig. 4 it will be seen that the lower ends of these links are connected by a bar *j*. It will also be seen that when the plates I and H approach each other the plate H will move to one side and the bar *j* will move toward the other side. By observing Figs. 3 and 4 it will be seen that such side movement of these parts will bring them in contact with the swinging catches O O and move them apart, so they will be disengaged from the plate M.

To understand the operation of these parts, let it be supposed that the left-hand key in Fig. 3 is depressed. This key has its shoulder *g'* nearer the end than any other key; hence under a full depression it will carry the plate K down farther than any other key, and hence



revolve the wheel L farther than any other key. This key will carry the plate K down to a point about midway between it and the plate H before the end of the key will meet the plate H. The depression of the key being continued, the plate H will be pressed down against the plate I, and this will release the swinging catches O from their engagement with the plate M. Meanwhile the wheel L has been revolved so far that the type corresponding to the key depressed has been brought on the under side of the wheel. The depression of the key being still further continued, all the plates K, H, I, and M will be carried down together with the wheel L, which will be pressed against the paper on the roller P and the impression made. The key being released from pressure, all the parts will resume their normal positions by the action of the springs  $g$ ,  $f'$ ,  $f''$ ,  $h'$ , and  $o$ .

Of course it will be understood that when a key having a long distance from its shoulder to its end is depressed the plates H and K will not approach each other but a short distance before they will be arrested by the end of the key coming in contact with the plate H, and hence the wheel L will only be revolved a very short distance.

$G^4$  is a spacer-key. It passes through the plate K and comes down close to the plate H and has no shoulder. When it is depressed, the plate K and the rack-bar D are not moved, but the plate H is pushed down upon the plate I, and the catches O are thereby released and the plate M and wheel L are depressed; but the wheel L will then be in the position shown in Fig. 3, with blank spacer over the paper, and so no impression will be made, but the arm  $m$  on the plate M will come in contact with the lever  $S^3$  and operate the escapement device above described, and thus feed the carriage ahead a space equal to one letter.

By observing Fig. 1 a key will be seen near the upper right-hand corner, (marked  $G^3$ ), and by observing Fig. 3 a dotted line Z Z will be seen across three rows of keys. This line is intended to mean that all keys in front of the key  $G^3$  have been cut off to show the key  $G^3$  and the key on each side of it in elevation. The key  $G^3$  passes through the plates K, H, I, and M, and connects with the pawl  $S^4$ , which has been referred to above as the pawl which operates upon the ratchet  $T'$ . On the stem of the key  $G^3$  is a collar 3, and on the stem of the key to the right is an arm 4, and on the button of the key  $G^3$  and the key to the left are overlapping lips 5. Now, if the key to the left of  $G^3$  is pushed down it will carry  $G^3$  with it, and if the key to the right is pressed down it will carry  $G^3$  with it after it has moved far enough to bring the arm 4 in contact with the collar 3. Now when the key to the right of  $G^3$  is depressed it will revolve the type-wheel so as to bring into position a type having two letters—as, for example, “it,” “at,” or “or”—and the key  $G^3$ , being carried down part of its limit of movement, will revolve the ratchet  $T'$

far enough to move the carriage a proper distance, and when the key to the left of  $G^3$  is depressed it will revolve the type-wheel so as to bring a three-letter type in position—as, for example, “the,” “and,” or “for”—and it will carry down the key  $G^3$  so far as to move the ratchet  $T'$  so as to feed a three-letter space.

If the key  $G^3$  is depressed alone, it will make a three-letter space, and it may be used for this purpose when desired.

It should be stated, perhaps, that the object of the plate H and links J is to loosen the catches O, and therefore if other means for disengaging the catches should be provided the plate H might be omitted, in which case the key end would impinge upon the plate I, which such case would be made to receive them.

The object of the rack E and plate on the top thereof and the extended key ends is to form a stop to arrest the rotation of the type-wheel at any desired point; hence if other means for stopping the wheel should be provided only the plate K and the rack D would be required, and the keys would not be shouldered at  $g'$ , but cut off at that point.

It will be seen by reference to Fig. 2 that the paper-holding roller P is mounted in yielding journal-boxes, which are supported by springs  $p^4$ . The object of this is to afford a yielding support for the paper against the impressing action of the type-wheel.

I do not herein claim the mechanism for spacing the carriage one or more spaces, as such mechanism is covered by a separate application filed by me July 13, 1889, Serial No. 317,499, which is a division of this case.

What I claim as new is—

1. In a type-writing machine, the combination of a type-wheel, a rack-bar and pinion for revolving said wheel, a presser-plate on the end of said rack-bar in position to be acted upon by keys, key-rods for acting upon said plate, which have necks which pass through said plate varying distances and in their action depress said plate varying distances, a second rack-bar operated from the type-wheel in an opposite direction and parallel with the first-named rack-bar, a plate on said last-named rack-bar which lies parallel with the presser-plate and impinges against the ends of the necks of the key-rods which pass through the presser-plate, substantially as and for the purposes set forth.

2. In a type-writing machine, the combination, substantially as set forth, of a type-wheel mounted on a plate or frame which is movable at right angles to the axis of said wheel and is retained from said movement by catches, a rack-bar for revolving said wheel, a presser-plate for moving said rack-bar, a series of keys for moving said presser-plate and rack-bar varying distances which extend through said presser-plate varying distances, a second rack-bar which lies parallel with the first-named rack-bar and is moved in an op-



posite direction thereto by said type-wheel, and supports a plate at its end which is parallel with the presser-plate, and impinges against the ends of the necks of the keys 5 which pass through the presser-plate, and moves sidewise when so pressed upon and loosens the catches which retain the frame which supports the type-wheel and allows said wheel to move at right angles to its axis 10 by the force exerted by the key upon both the presser-plate and the secondary plate.

3. In a type-writing machine, the combination, substantially as set forth, of the type-wheel L, mounted on the plate or frame M, 15 which is supported by the catches O, the spur-gear L' on the hub of said wheel, the rack-bar D, for engaging with said spur-gear and revolving said wheel, the presser-plate K on the end of said rack-bar, a series of keys G, of

varying lengths, passing through said plate 20 K, with abutting shoulders at varying distances from the ends of said keys, the rack-bar E, lying parallel to the rack-bar D and moving in opposition thereto, the plate I on the end of said rack-bar E, the plate H, hung 25 on said plate I by parallel links J and supported by the spring  $h'$ , the rod  $j$ , connecting the links J at one end of said plates, the rods F, springs  $f'$  and  $f^2$  on said rods F, for reacting the said working parts, and the springs 30  $o$   $o$ , for reacting the catches O O.

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

GEO. C. BLICKENSDERFER.

Witnesses:

M. F. HALLECK,  
R. H. PORTER.