

(No Model.)

3 Sheets—Sheet 1.

E. S. BELDEN.  
TYPE WRITING MACHINE.

No. 324,520.

Patented Aug. 18, 1885.

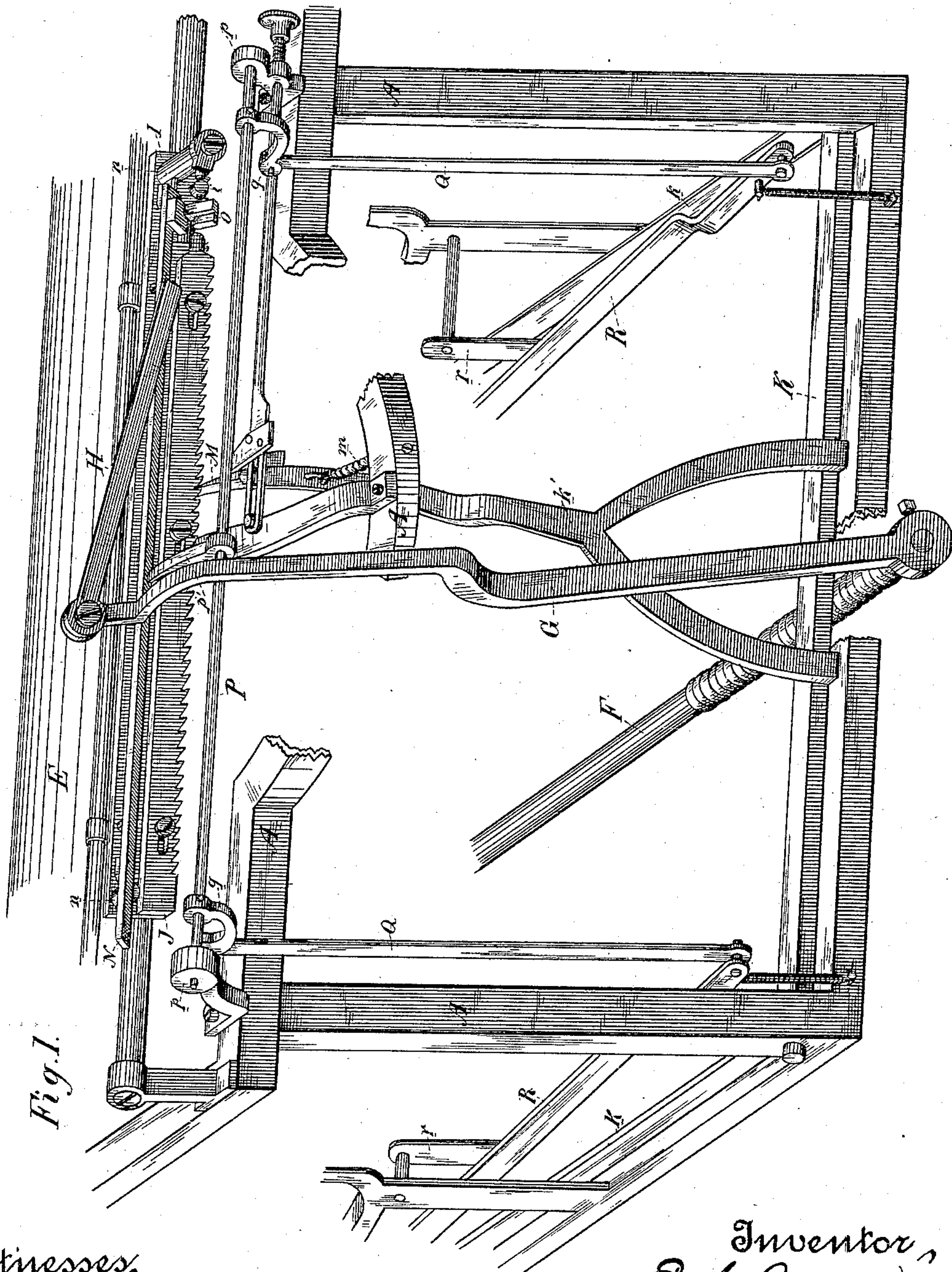


Fig. 1.

Witnesses,  
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J. A. House.

Inventor,  
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By  
Dewey & Co.  
Attorneys



(No Model.)

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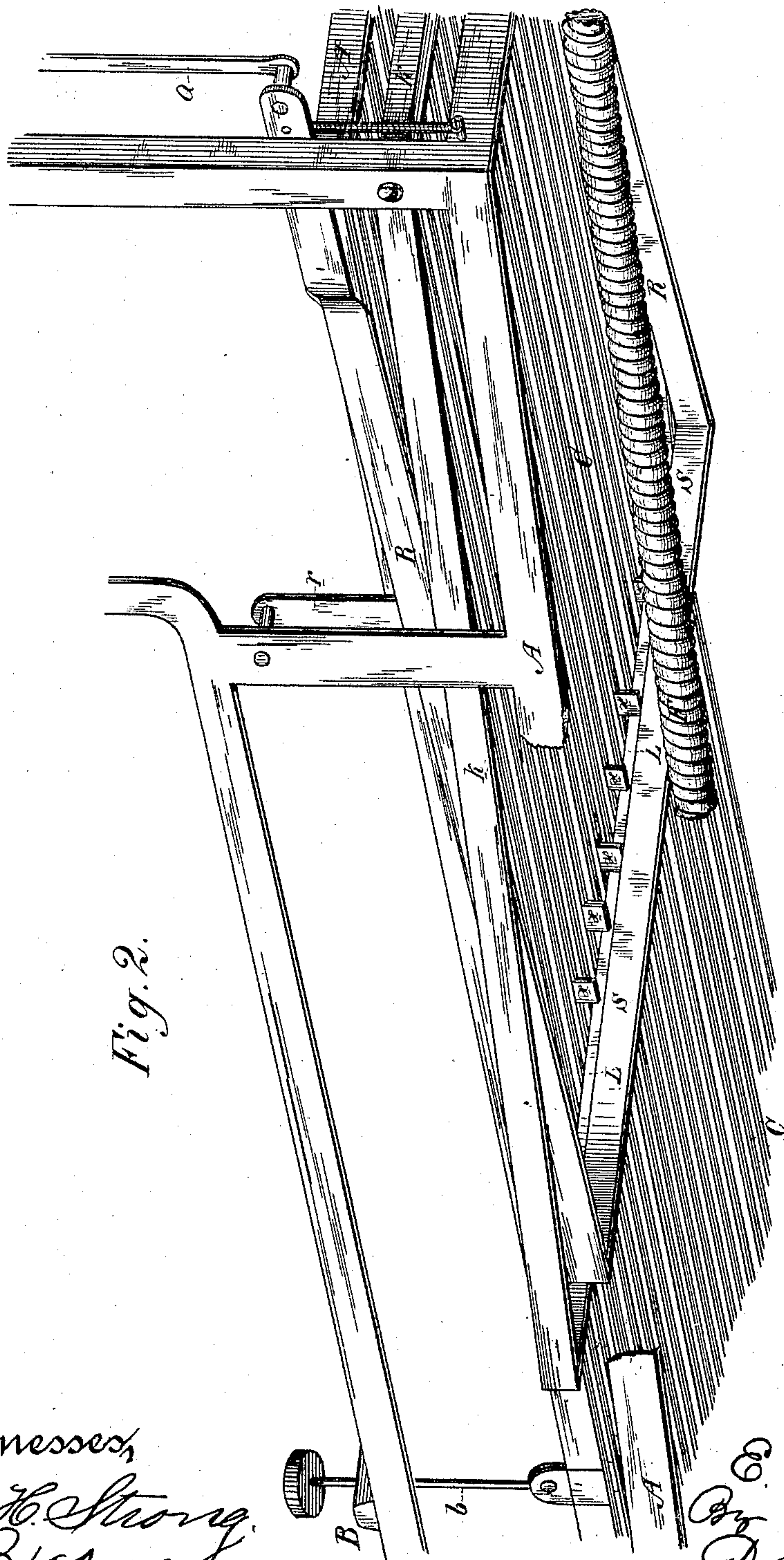


Fig. 2.

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(No Model.)

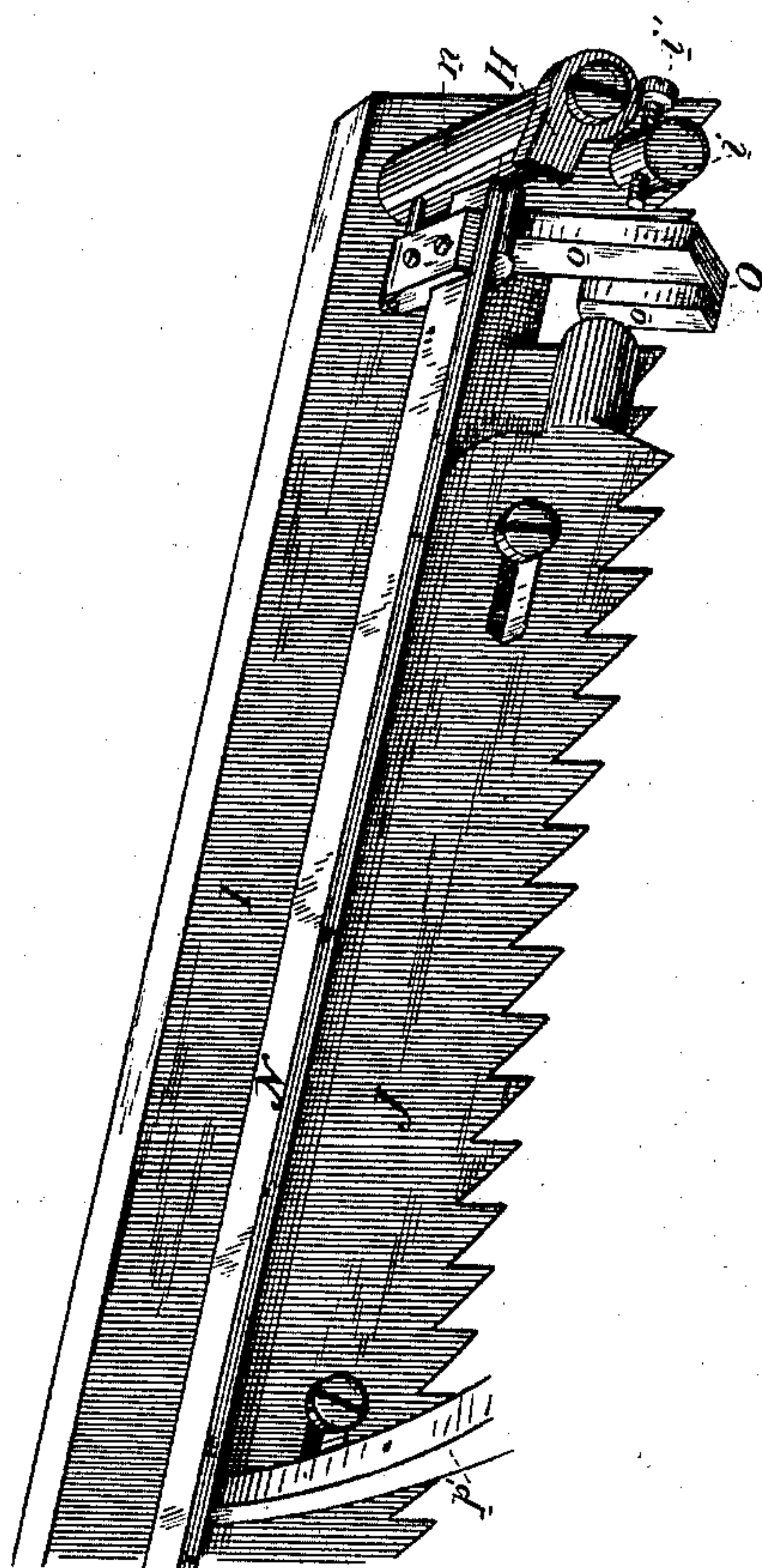
3 Sheets—Sheet 3.

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Fig. 3.



Witnesses,  
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# UNITED STATES PATENT OFFICE.

EDWIN S. BELDEN, OF SAN FRANCISCO, CALIFORNIA.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 324,520, dated August 18, 1885.

Application filed October 2, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN S. BELDEN, of the city and county of San Francisco, and State of California, have invented an Improvement in Type-Writing Machines; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to that class of type-writing machines known as "caligraphs," and to a new and useful improvement therein, the object of which is to give to each letter or other character approximately suitable space according to the requirements of its width.

On the 27th day of March, 1884, I filed an application for a patent, Serial No. 125,781, for an improvement in caligraphs, the object of which was to make the last letter of a word and the space following it at the same time. This was accomplished by the mechanism operated by the space bar or key, which permitted the paper-carriage to move a greater distance than any of the type-keys could effect. My present invention embodies a part of that mechanism, conducing to the same end of permitting a varied movement, between suitable limits, of the paper-carriage; but the present mechanism, while differing somewhat in details, is essentially different in the graduated stop and the means employed for calling it into action, as the result to be attained is of a different nature.

My invention consists in the devices which I shall hereinafter fully explain by reference to the accompanying drawings, in which—

Figure 1 is a perspective rear view of a part of the frame of a caligraph, showing it in skeleton with my improvement attached. Fig. 2 is a perspective view of the bottom, taken from the rear. Fig. 3 is an enlarged detail perspective of the graduated stop, showing its relation to adjacent parts.

It will be necessary, in order to show the application of my invention, to describe briefly the main features of a caligraph and their operation.

A is the frame; B, the rows or banks of keys on spindles *b*, connected with and adapted to depress the key-levers C, to which the rods which operate the usual type-levers are attached.

On top of the machine is mounted on the

usual guide-rails the traveling paper-carriage E, which derives its motion from right to left by means of the spring-rod F under the machine, the bent arm G, and the link H, all arranged in the customary manner.

Upon the back of the paper-carriage is secured the horizontal fixed rack I, upon the back of which is attached, by the usual pin-and-slot connection, the sliding or slip rack J, which, under the influence of a spring, (not herein shown,) has a constant tendency to move to the left to its limit against a lug, *i*, on the fixed rack, or, as herein shown, against the stop-screw *i'*, set in the lug, and which, as I shall hereinafter show, forms (though not essentially) a part of my graduated stop.

Pivoted horizontally in the lower portion of the back of the machine is the rocker-shaft K, operated by the side arms, *k*, the forward ends of which carry the cross-bar L, with which the key-levers come in contact. The rocker-shaft K has an arm, *k'*, the top of which carries the pawl M, which engages with the racks. A spring, *m*, pulls the pawl back after it has been rocked forward. The normal position of the pawl is in engagement with the sliding rack J; but when moved forward it releases said rack and engages with the fixed rack I. Thereupon the rack J slips to the left, as I have heretofore mentioned, whereby the pawl, upon returning backward, engages with a tooth to the right of the one whose engagement is left. The fixed rack, being then released, moves to the left, carrying the paper-carriage. It has been customary to thus release the rack and catch it again by the succeeding tooth, whereby the same space is allotted to each letter or character irrespective of its width. As some letters are wider than others, it is manifest that an irregularity in the printing results; but if each letter or character be given approximately its required space this irregularity will not occur, and the printing will be much more uniform.

For the purposes of my present illustration I divide the letters of the alphabet into three classes, grouping in one class the narrow, in another the medium, and in the third the wide letters. I then so divide the teeth of the racks that the distance between adjacent



teeth shall equal the space of the narrowest letters, the distance of two teeth shall equal the space required by those of medium width, and the distance of three teeth shall equal the space of the widest letters.

In order to cause the carriage to move one, two, or three teeth before being limited, I have a graduated stop, which is adapted to variously limit the motion of the sliding rack, whereby it may be brought into proper position to be re-engaged by the pawl in the proper tooth.

Pivoted in small lugs *n* on the fixed rack is a flap-bar, *N*, its end being provided with a wing-plate, the face of which is provided with a rabbet, whereby a graduated stop, *O*, is formed. This stop is adapted by the motion of the flap-bar to lie in line with the end of the sliding rack. Now, when the stop is swung to such a position that the sliding rack strikes its thickest portion, it will be limited to a slighter movement than when it strikes its deepest portion, and thus the stop can be so arranged that the rack, by coming in contact with one portion of it, shall be limited to move but one tooth, and by striking other portions shall be limited to move two, three, or even more teeth.

The mechanism by which the graduated stop is thus operated is as follows: Pivoted in bearings *p* at the back top of the machine is a rock-shaft, *P*, carrying an arm, *p'*, which bears up under and is adapted to raise the flap-bar by which the stop is carried. Secured to the rock-shaft, near each end, are the cranks *q*, to which rods *Q* are secured. The lower ends of the rods are pivoted to the side arms, *R*, which are themselves pivoted between the power and weight by the hangers *r*. The forward ends of the arms *R* have a cross-bar, *S*, extending under the key-levers. These latter levers are adapted to come in contact with and depress the cross-bar *S*, whereby the shaft *P* above is rocked, through which the flap-bar is raised to swing its graduated stop into proper position for the sliding rack to operate against it. It will be seen that the extent of the depression of the cross-bar *S* controls the movement of the graduated stop, and therefore the key-levers are adapted to come in contact with said bar during more or less of their stroke, according to the width of the letters operated by said levers. This is accomplished in any suitable manner, as by the pieces or lugs *x* on the bottoms of the levers, some of which, as for the thick letters, are wide, and some, for the narrow letters, are narrower, whereby the bar *S* may be depressed to various distances. This would be the general operation if my invention were carried out strictly on the ideas herein expressed; but there is a peculiarity in the mechanism which results from a further idea, and which I shall now explain.

In dividing the letters of the alphabet into three classes, as I have described, it will be found that those of medium width are far

more numerous, and consequently occur more frequently, than the narrow or the wide letters. I therefore so arrange the levers of the medium letters that they shall not come in contact with the cross-bar *S* at all, whereby the graduated stop has no motion imparted to it, but remains in a state of rest while these letters are being printed. Consequently I so form the graduated stop that its rearmost depression or rabbet (designated by *o*) shall, when the stop is at rest, be in line to receive the impact of the sliding rack, and this rabbet is made deep enough to limit the rack after it has moved a distance of two teeth. In this way, with the large majority of the letters, the stop does not move. The portion *o'* of the stop immediately forward of *o* is thicker, and when swung back into line with the sliding rack limits its movement to one tooth, and therefore this motion of the stop is derived from the operation of the key-levers of the narrow letters, acting through cross-bar *S*, arms *R*, rods *Q*, rock-shaft *P*, arm *p'*, and flap-bar *N*, as I have described. Now, if I chose, I could make the next portion of the stop the deepest of all, and cause it to swing back into position by motion derived from the operation of the key-levers of the wide letters, whereby the rack would be limited only after it had moved three teeth; but instead of doing this, which would increase the size of the stop, I provide that the screw *i'*, heretofore mentioned, shall act as the third stop, and I consequently cause the key-levers of the wide letters to depress the cross-bar *S* to such an extent as to swing the stop *O* back entirely out of the way, thus allowing the rack to come in contact with the screw.

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

1. In a type-writing machine, the combination of a vibrating pawl operated by the key-levers, a fixed and a sliding rack, as described, and a swinging graduated stop, against the several graduations of which the sliding rack is adapted to come in contact, whereby the movement of the paper-carriage is limited at varying distances, substantially as herein described.

2. In a type-writing machine, the combination of a vibrating pawl operated by the key-levers, a fixed and a sliding rack, as described, a graduated stop, against which the sliding rack is adapted to bear, whereby the movement of the paper-carriage is limited, and a mechanism, substantially as described, consisting of levers and connecting-rods operated by the key-levers to swing the graduated stop into position to bring its several graduations or depressions into line with the sliding rack, according to the key-lever operated, whereby the movement of the paper-carriage is limited at varied distances, substantially as and for the purpose herein described.

3. In a type-writing machine, a vibrating pawl operated by the key-levers, a fixed and



a sliding rack, as described, and the graduated stop O in line with the end of the sliding rack, and adapted to limit its movement, in combination with the mechanism by which said stop is vibrated to bring its several graduations or depressions into line with the sliding rack to limit the movement of the paper-carriage at varied distances, consisting of the pivoted flap-bar N, on which the stop is mounted, the rock-shaft P, having arm  $p'$ , bearing under the flap-bar, the cranks  $q$  on the shaft, the connecting-rods Q, the pivoted side arms, R, and the cross-bar S, passing under and adapted to be depressed to different distances by the key-levers, substantially as and for the purpose herein described.

4. In a type-writing machine, the traveling paper-carriage E, the adjacent fixed and sliding racks I J thereon, the key-levers C, and the controlling-pawl M, vibrated by the operation of the key-levers acting through suitable mechanism, as described, in combination with the graduated stop O in line with the end of the sliding rack, the pivoted flap-bar N, on which it is mounted, the rock-shaft P, having arm  $p'$ , for operating the flap-bar, the cross-bar S, passing under and adapted to be depressed to various distances by the key-levers, and connecting devices, substantially as described, whereby the motion of bar S is transmitted to the rock-shaft, substantially as and for the purpose herein described.

5. In a type writing machine, the combination of a vibrating pawl operated by the key-levers, a fixed and a sliding rack, as described, the graduated stop O in line with the end of the sliding rack, the pivoted flap-bar N, on which the stop is mounted, the rock-shaft P, having arm  $p'$ , the cross-bar S, passing under the key-levers, and connecting devices, substantially as described, between said cross-bar and rock-shaft, whereby when the former is

depressed the latter is rocked to swing the graduated stop, in combination with the key-levers C of the machine, provided with lugs  $x$  of different widths, and adapted to depress the cross-bar S to different distances, substantially as and for the purpose herein described.

6. In a type-writing machine, the combination of a vibrating pawl operated by the key-levers, a fixed and a sliding rack, as described, the graduated stop O, having a rabbet or depression,  $o$ , in line with the sliding rack when said stop is at rest, and adapted to limit said rack after it has moved a distance of two teeth, and a shoulder brought in line with the sliding rack by the swinging of said stop to limit the rack after it has moved one tooth, the pivoted flap-bar N, the cross-bar S, and connecting devices, substantially as described, for transmitting motion to the graduated stop, in combination with the key-levers C of the machine, some of which vibrate free of the cross-bar S, whereby the stop remains at rest and others depress the bar to various distances to swing the stop through a longer or shorter arc, substantially as and for the purpose herein described.

7. In a type-writing machine, in combination with a vibrating pawl operated by the key-levers, and a fixed and a sliding rack, as described, the swinging graduated stop O, operated by the key-levers to limit at different distances the movement of the sliding rack, and the stop-screw  $i'$  in a lug,  $i$ , on the fixed rack, adapted to receive and limit the sliding rack at a certain distance when the stop is moved back, substantially as herein described.

In witness whereof I have hereunto set my hand.

EDWIN S. BELDEN.

Witnesses:

C. D. COLE,  
J. H. BLOOD.