

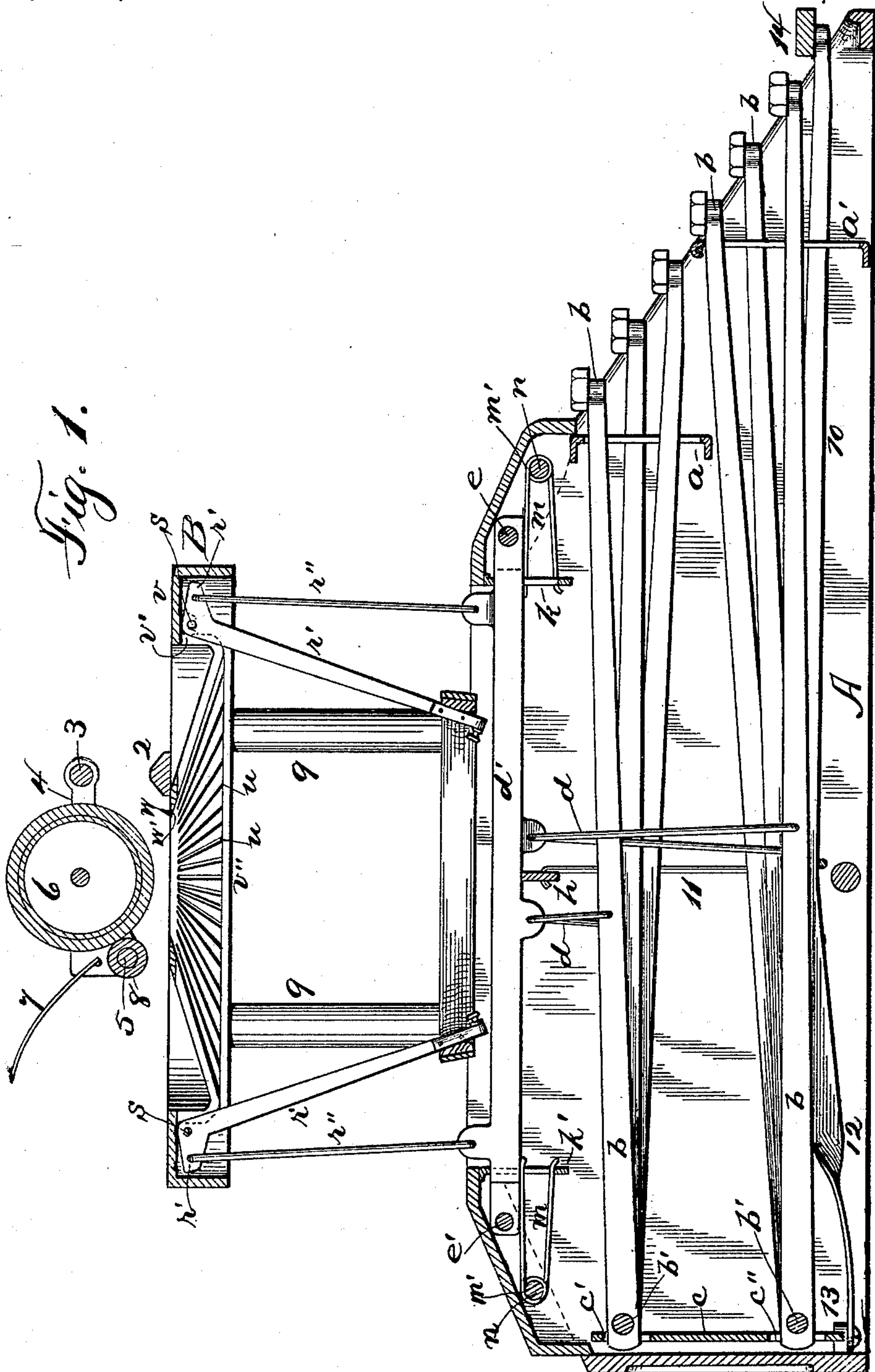
(No Model.)

2 Sheets--Sheet 1.

L. S. CRANDALL.
TYPE WRITING MACHINE.

No. 509,793.

Patented Nov. 28, 1893.



WITNESSES:

H. A. Carhart
C. B. Kinsie

INVENTOR

Lucien S. Crandall

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ATTORNEYS.

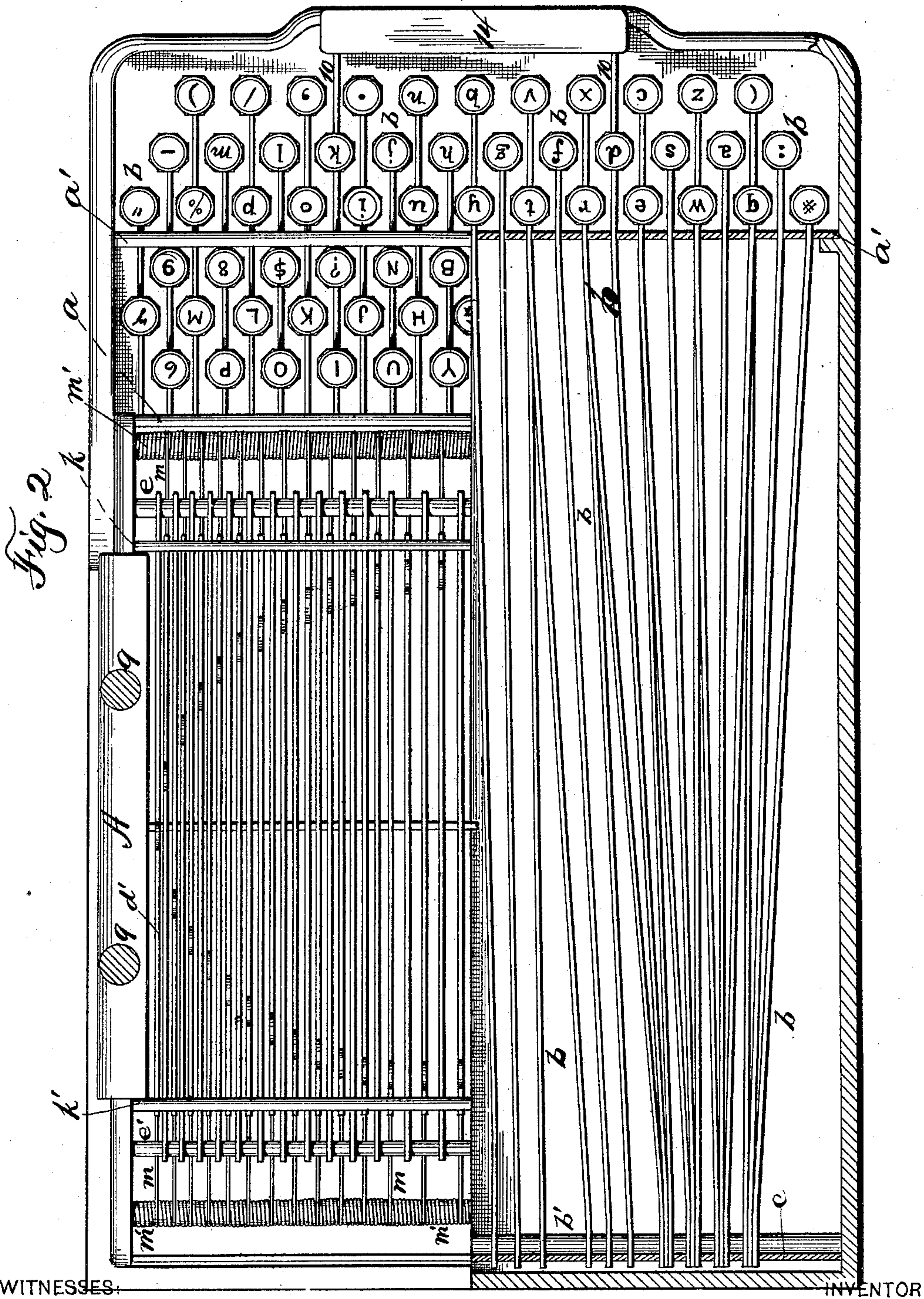
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THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LUCIEN S. CRANDALL, OF PARISH, ASSIGNOR TO WILLIAM A. SWEET, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,793, dated November 28, 1893.

Application filed January 21, 1893. Serial No. 459,057. (No model.)

To all whom it may concern:

Be it known that I, LUCIEN S. CRANDALL, of Parish, in the county of Oswego, in the State of New York, have invented new and useful
5 Improvements in Type-Writing Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to type-writers and
10 particularly to the "action" thereof or the lever mechanism by which the type-arms are operated to make their imprints upon the paper upon the platen.

My object is to produce a new type-bar key-
15 lever mechanism comprising rearwardly pivoted key-levers, arranged partly parallel and partly out of parallelism, upon a pivot rod and projecting rearward into a vertical plate provided with vertical slots of varying width,
20 said key-levers being also arranged in banks, and connected to auxiliary levers above them, which are alternately pivoted front and rear and are connected to the type-bars, in which the type-bars are guided in their vertical
25 movements by vertical and radial slots in the type-bar ring; in which the auxiliary levers are guided vertically in slotted combs receiving their ends; in which all of said auxiliary levers rest upon, or are supported by a cross
30 bar, vertically movable and connected to the spacing-key-levers; and in which the type-bars are pivoted in a type bar ring, which is radially slotted, said slots receiving more or
35 less of said type-bars and guiding them in their vertical movements and preventing any lateral springing thereof.

My invention consists in the several novel features of construction and operation hereinafter described and which are specifically
40 set forth in the claims hereunto annexed. It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1, is a vertical sectional elevation of the frame of the machine, the action, and
45 part of the carriage. Fig. 2, is a horizontal sectional elevation of the machine, showing on the right, the primary levers, and on the left the auxiliary levers also, and the mountings of each.

50 A, is the frame of the machine provided, across its front, with the vertically slotted

rails —a—a'— through which slots the primary key levers —b— pass and in which they are guided in their vertical movements, their rear ends being pivoted upon bars —b'—
55 across the rear of the frame, said frame also having a vertically slotted rail —c— which slots —c'—c''— freely receive the heels of said key levers and operate as spacers to separate the rear ends of said levers, while the rails
60 —a—a'— are the front spacers. When the key-board is provided with a double bank of keys, the rail —a— receives the lower bank and the rail —a'— the upper bank. It will also be seen that the slot-ways —c''— are
65 of varying widths, enabling me to arrange the key levers in groups as well as singly in the lower bank, so that while the front ends of the key levers, in both banks, are in vertical alignment, yet the departure of the keys
70 in the lower bank from horizontal parallelism is such as to create vertical passages through which the connecting bars —d— can pass freely, their lower ends being hooked into or
75 pivotally connected to the key levers, and their upper ends being similarly connected to the auxiliary levers —d'—. These auxiliary levers are arranged in alternation the front ends of part being pivoted upon a front
80 cross-bar —e— mounted in the frame, and the rear ends of the others being pivotally connected to the rear cross-bar —e'—, all of said bars being spaced upon said cross-bars, and lying parallel to each other, substantially
85 as shown. The letter spacing bar —h— extends across under the auxiliary levers, and is depressed by each one in the usual manner, the escapement mechanism and the connections of the spacer bar thereto not being
90 shown. The auxiliary levers are inserted through and fit freely in the vertically slotted comb-bars —k—k'— carried by the main frame, and the spring arms —m— of the spring —m'— coiled around the cross-rods
95 —n— mounted in the slotways, in such manner that the upper arm of each bears upward against the free end of an auxiliary lever, and each operates to return its auxiliary lever and the key lever connected to it to their
100 normal position after a depressed key-lever has been released. Each auxiliary lever is

connected to the heel —*r*— of a type arm —*r'*— by means of a pull rod —*r''*— pivotally connected to both said lever and heel.

Each type arm is pivoted upon a pivot —*s*— in such manner that part of its body will normally lie in one of the radial slotways —*u*— in the type-bar ring —*B*—. This type-bar ring comprises a top-plate —*v*—, an inner vertical wall —*v'*— slotted coincidentally with the radial slots, an upwardly rising, crowning or frustro-conical table —*v''*— in which the slots —*u*— are cut, and an inner ring —*w*— to which all of said slots —*u*— extend, said ring being shown as beveled on the under side of its inner edge as at —*w'*—. Upon this type bar ring the track-way —*2*— is mounted which carries the front of the carriage, the mounting of the carriage and its special construction not being here shown, as it forms the subject matter of another application filed concurrent herewith, the parts shown comprising a front rod —*3*—, an end bar —*4*—, a back rod —*5*—, a platen —*6*— mounted upon an arbor, a paper apron —*7*—, and a feed-roller —*8*—.

Posts —*9*— carry the top-plate of the machine.

The letter spacing bar —*h*— is connected to the word spacing key-lever —*10*— by a rod —*11*—, said lever being of sheet-metal set vertically and rearwardly twisted, as at —*12*—, so that its rear end which is rigidly secured to a lug —*13*— on the frame is horizontal, and this rear portion constitutes the spring by which said lever and its space-bar —*14*— upon its outer end is returned to its normal position after being depressed.

It will be seen that all of the key levers and auxiliary levers are made from sheet-metal, straight-sided, simply stamped or cut out; that the spacing key bars are of like construction, except that they are twisted to give the spring action to them; and that all of the connections between the key levers and the auxiliary levers, between the latter and the type-arms, and between the space-key bars and the spacer bar, consist of wires properly bent or hooked at their ends; and that the type-bar ring is simply made, being stamped up with dies from sheet metal, in one or more pieces; that the operation of the key-levers is positive, easy of operation and light of touch; and that the type arms are vertically guided in their movements, thereby preventing all

lateral vibration and preserving both the alignment and letter spacing; and that the space-key bars each have a self-contained spring part of the bar itself.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a type-writer, key levers rearwardly pivoted upon cross-rods, in combination with a vertical plate, having vertical slots of varying widths receiving the rear ends of said levers in the rear of the cross-rods, whereby part of said key levers are arranged out of parallelism.

2. In a type-writer, key levers rearwardly pivoted upon cross-rods, part of them being parallel and part being out of parallelism, in combination with parallel auxiliary levers above them, alternately pivoted in front and rear, and rods connecting them to the key levers.

3. In a type-writer, key levers disposed in banks, and rearwardly pivoted upon cross-rods, part of said levers being parallel and part out of parallelism, in combination with parallel auxiliary levers above them, alternately pivoted front and rear, and rods connecting them to the key levers.

4. In a type-writer, key levers arranged in banks and rearwardly pivoted and arranged partly parallel and partly out of parallelism, in combination with parallel auxiliary levers above them, alternately pivoted front and rear, rods connecting them to the key levers, and a vertical plate having vertical slots of unequal widths receiving the ends of the key-levers in rear of their pivots.

5. In a type-writer, key levers arranged in banks and rearwardly pivoted and arranged partly parallel and partly out of parallelism, in combination with parallel auxiliary levers above them, alternately pivoted front and rear, rods connecting them to the key levers, and a vertical plate having vertical slots of unequal widths receiving the ends of the key levers in rear of their pivots, a type-bar ring, type arms pivoted therein, and rods connecting them to the auxiliary levers.

In witness whereof I have hereunto set my hand this 24th day of December, 1892.

LUCIEN S. CRANDALL.

In presence of—

C. W. SMITH,

HOWARD P. DENISON.