

(No Model.)

2 Sheets—Sheet 1.

L. S. CRANDALL.  
TYPE WRITING MACHINE.

No. 414,296.

Patented Nov. 5, 1889.

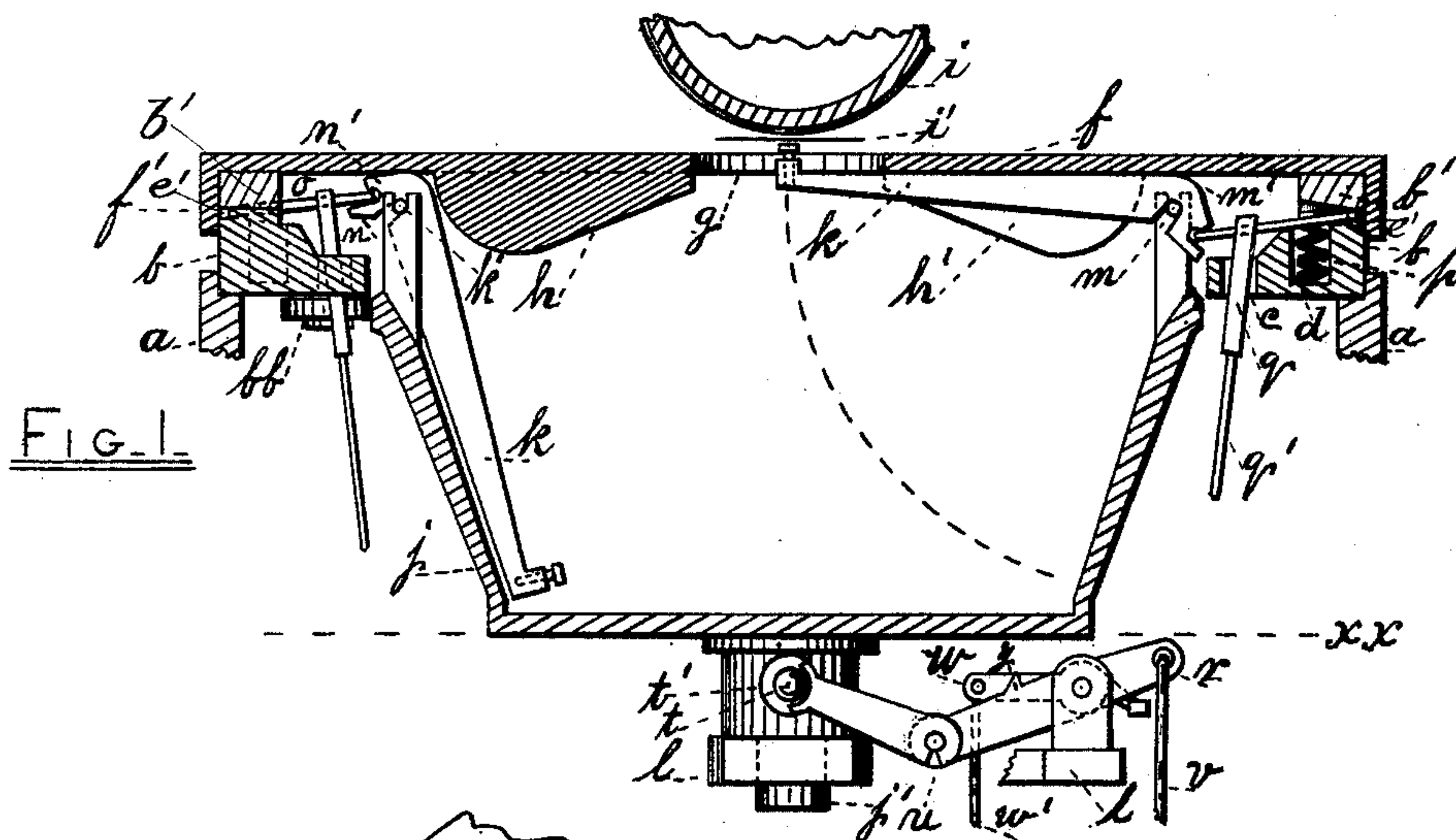
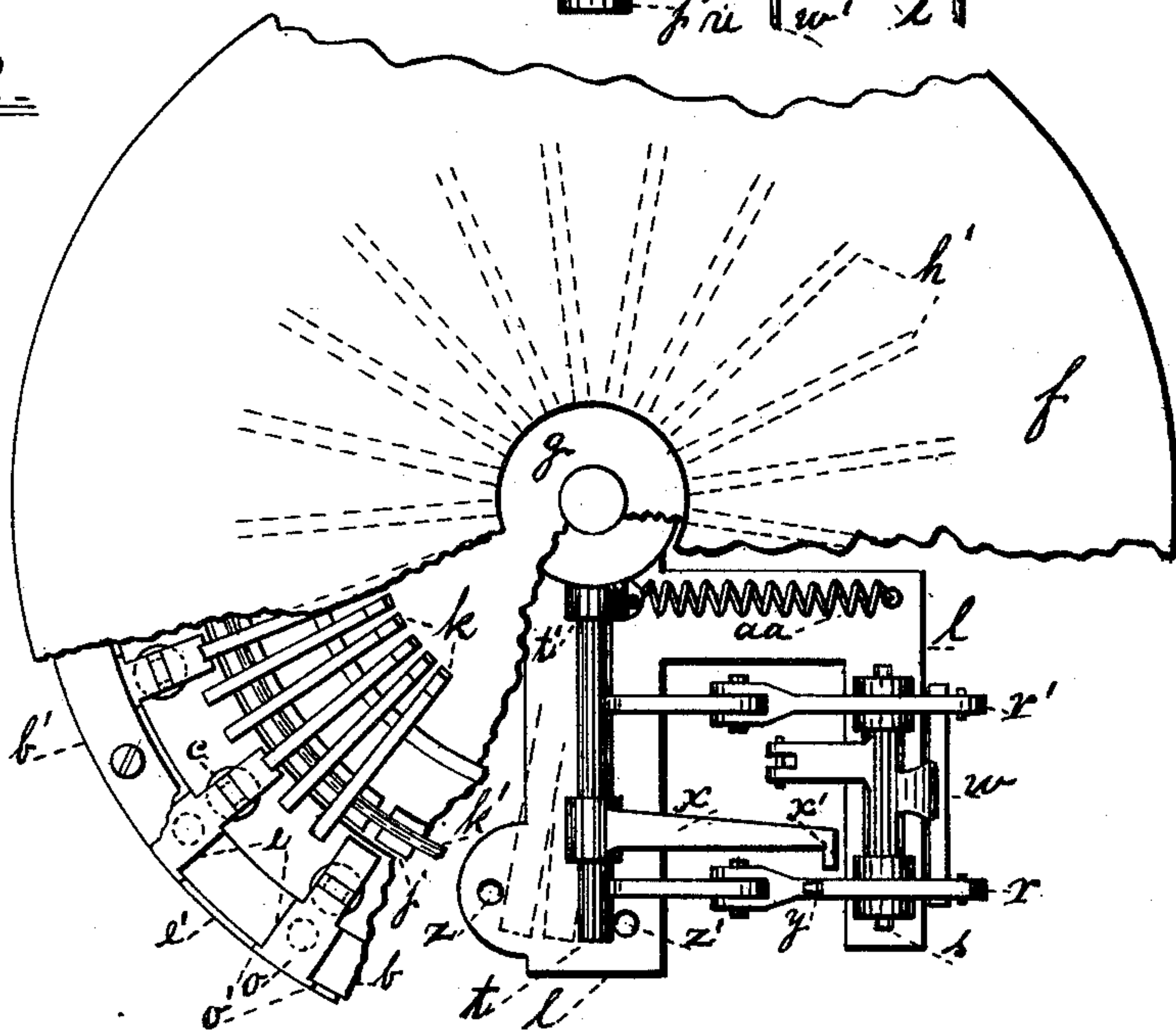


FIG. 2.



Witnesses:

Charles M. Prouse  
M. A. Peck

Inventor:

Lucien S. Crandall

(No Model.)

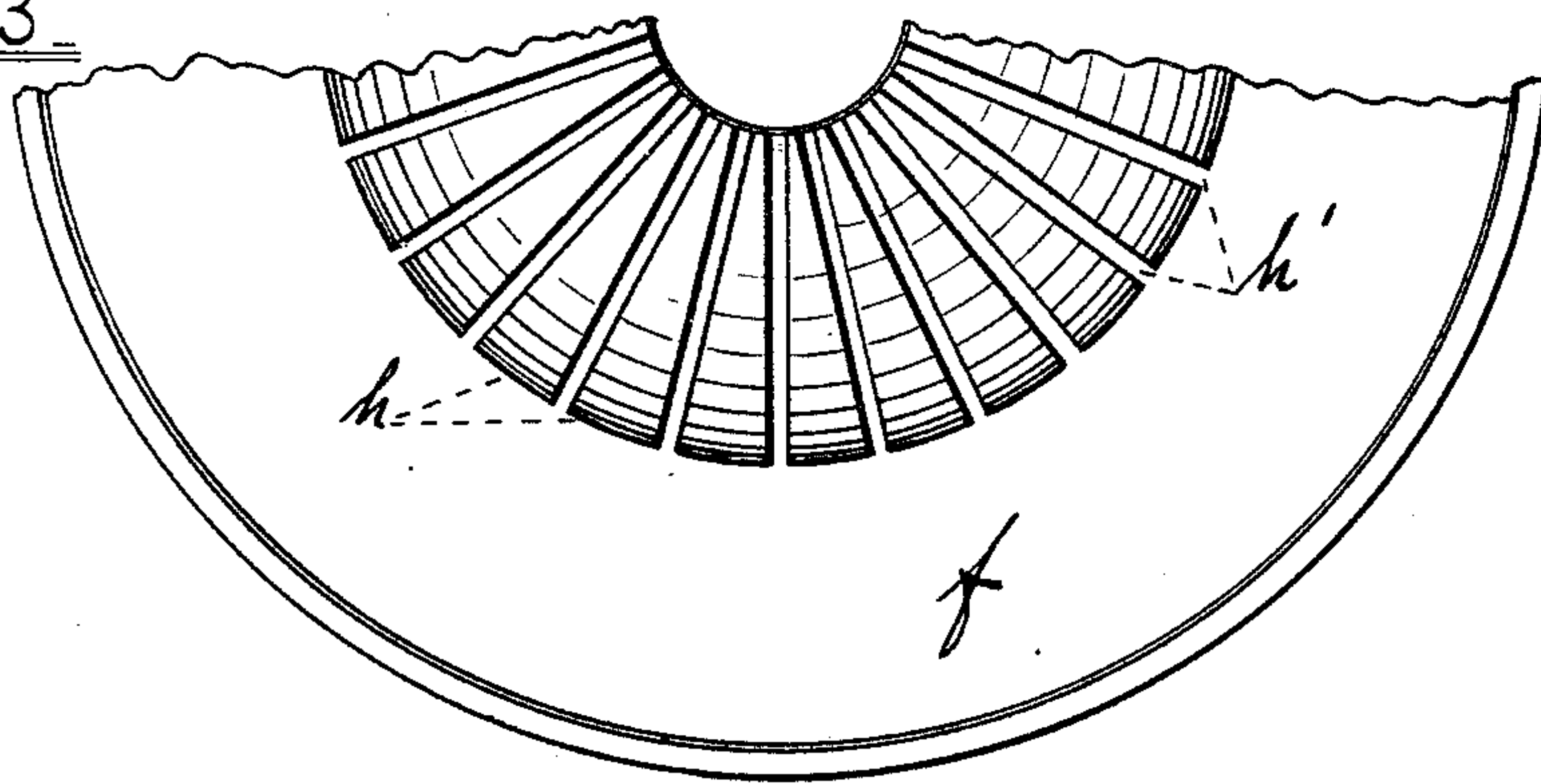
2 Sheets—Sheet 2.

L. S. CRANDALL.  
TYPE WRITING MACHINE.

No. 414,296.

Patented Nov. 5, 1889.

FIG. 3.



Witnesses:

Charles M. Crouse

M. A. Peck

Inventor:

Lucien S. Crandall



# UNITED STATES PATENT OFFICE.

LUCIEN S. CRANDALL, OF SYRACUSE, NEW YORK.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 414,296, dated November 5, 1889.

Application filed January 16, 1886. Serial No. 188,734. (No model.)

*To all whom it may concern:*

Be it known that I, LUCIEN S. CRANDALL, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Type-Writing Machines, of which the following is a specification.

My invention relates to improvements in that class of type-writers in which the types are placed on the free ends of a series of levers or type-bars, said type-bars being arranged in a circle or arc thereof and adapted so as to deliver their impression at a central common printing-point.

The objects of my invention are, first, to enlarge the functions of a given number of key-levers; second, to provide a means of more perfect alignment, and, third, to considerably reduce the number of parts heretofore deemed necessary in type-writers of the above-named class. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my invention down to the broken line  $xx$ , from which line downward it is shown in elevation; Fig. 2 is a top view of the same with parts cut away, so as to better show the relations thereof; and Fig. 3 is a bottom view of the cap-plate, hereinafter described.

To the supporting-frame  $a$  of a type-writer is firmly attached a ring  $b$ , provided with certain holes  $c$ , chambers  $d$ , radial slots  $e$ , and an annular mortise  $e'$ , the functions of which will be hereinafter described. Surmounting  $b$  is another ring  $b'$ , provided with radial slots corresponding with  $e$  in  $b$  and serving in a general way to retain the parts supported by  $b$ . Fastened to  $b'$  and surmounting it is a cap-plate  $f$ , provided with a flange  $f'$ , which encircles and covers the mortise  $e'$  in  $b$ . The cap-plate  $f$  is also provided with a circular aperture  $g$  at its center and a downwardly-extending annular lug  $h$ , which is provided with a series of radial slots  $h'$ , for a purpose explained hereinafter.

In Fig. 1,  $i$  and  $i'$  are designed to represent, respectively, the platen and inking-ribbon of a type-writer. In this instance the "basket" or inclosing basin-like frame in which are contained the type-bars  $k$  is not rigidly at-

tached to the frame of the type-writer, as is usually the case, but is mounted upon a downwardly-extending shaft  $j$ , which is provided with a bearing in the supporting-bracket  $l$ , and said basket, with the entire system of type-bars contained therein, is adapted to be rotated, for the purpose hereinafter shown. The upper edge of  $j$  is slotted to receive the outer ends of the type-bars  $k$ , and is also provided with an annular slot in which rests the wiring  $k'$ , which forms the common fulcrum of all the type-bars  $k$ ,  $k$  being provided with a slot  $m$ , so as to drop down upon  $k'$ , and being also rounded on its upper side at  $m'$ , so as to move freely under the cap-plate  $f$  and still be retained by it on  $k'$ . At its outer end  $k$  is also provided with a flaring mortise or slot having a longer limb  $n$  and a shorter limb  $n'$ . The free end of a T-shaped tongue  $o$  fits loosely into said mortise between  $n$  and  $n'$ . Said tongue is loosely held at its rear end by its two ears  $o'$ , resting in mortise  $e'$  of  $b$ , and is also secured by the edges of slot  $e$  in  $b$ .  $o$  is pressed upwardly against  $b'$  by a coiled spring  $p$  in  $d$ . A loop  $q$  also passes over  $o$  and down through  $c$ , connecting with the key system of the type-writer by means of the stringing-wire  $q'$ , as in type-writers generally of the class to which my invention refers. When  $q$  is pulled down by the depression of a key-lever, carrying the free end of  $o$  down also, said free end of  $o$ , bearing in said mortise on  $k$ , causes  $k$  to deliver an impression upon  $i$  through  $i'$ , as shown on right-hand side of Fig. 1, and, when the operator withdraws his finger from the key-lever,  $p$  by its retractile effort restores  $o$ , and with it  $q$  and  $k$ , to normal position, as shown on left-hand side of Fig. 1. The open mortise in  $k$  between  $n$  and  $n'$  admits of a number of levers  $k$  being successively acted upon by one and the same tongue  $o$  in the manner just described by means of the rotary movement of  $j$ , heretofore alluded to, bringing said number of levers  $k$  successively into engagement with a given one of tongue  $o$ .

In practice I provide a tongue  $o$  to three of levers  $k$ ; but I do not confine myself to that specific arrangement, as it is obvious that it may be curtailed or extended. For example, if I provide my key-board with twenty-six keys, answering normally to the



“lower-case” letters of a font of type, and provide the same number of tongues *o*, I may provide three times as many levers *k*, and by simply rotating *j* the distance from one lever *k* to another, present an entire new set of levers *k* to be acted upon by *o*. These may be capital letters, whereas those upon the twenty-six type-bars normally presented to *o* were lower-case; and, again, by shifting *j* axially a greater distance than before I may present to be acted upon by tongues *o* a third entire set of levers *k*, which in this instance would be provided with numerals, marks of punctuation, &c. The twenty-six finger-buttons, being provided each with a letter of the alphabet which answers equally well for “caps” or lower-case, may also be provided with numerals, &c., as is obvious, and so the one key-board of twenty-six keys be made triple in its function.

To communicate rotary movement to *j* for the two positions other than the normal position, as above, I have provided two elbow-levers *r* and *r'*, which swing upon the fulcrum *s*, and at their working end push against a pin *t*, extending out from a boss *t'* on the underside of *j*. These elbow-levers are provided with joints *u*, like those in the braces of a buggy-top, for the purpose of arresting their action upon *t* at the moment when they are fully straightened, and also that they may remain locked in that position. The elbow-levers are straightened by depressing finger-keys connected with the lower ends of the stringing-wires *v*. Swinging upon *s* is a T-shaped lever *w*, the office of which is to unlock or return either *r* or *r'* when straightened, as before described. It also is operated by a stringing-wire *w'*, connecting with a key-lever provided for the purpose. Of course the operating of *r*, *r'*, and *w* requires three extra key-levers in the key-board of the type-writer on which they are used. When *r* is operated, *t* is thrust forward sufficiently to rotate *j* the distance from *k* (lower-case) to *K*, (capital,) as above. To insure that *t* shall not go too far, and that it shall also be held firmly in exact position when so moved, I provide on *t* an arm *x*, with a hook or projection *x'*, which swings into the path of a tooth *y* on *r* whenever *r* is straightened, to the effect that *t* is arrested and held firmly in place until *r* is returned by *w*. The elbow-lever *r'* engages *t* at a point half-way from *j'* to *r*, so that when operated it swings *j* twice as far as does *r*, thus presenting still another set of levers *k* to tongues *o*, as above. The movement of *t* is in this instance arrested by the stop-peg *z*. A return-spring *a a*, after each movement of *t*, returns it to normal position against another stop-peg *z'* and retains it there.

The cap-plate *f*, as before stated, is provided with a downwardly-extending lug *h*, which is provided with radial slots *h'*. (See Fig. 3.) These radial slots correspond in number and position with tongues *o*, and one set of levers

*k* swings freely up into said slots when *j* is in normal position. When *j* is rotated by means of *r*, as before shown, another set of levers *k* is in position to swing up into said slots, and when *j* is moved, as above, by *r'* still another set of levers *k* is in position to swing up into said slots. These slots are for the purpose of guiding the free end of *k*, so that it shall deliver its blow with precision, and the delivering of the blows or impressions of *k* with precision as to locality effects what is known in type-writing as “alignment.”

It is well known that in type-writers of the class to which my invention applies the type-bars from various causes become loosened and misplaced and so deliver their impressions erratically, making the letters of words to appear staggering or out of alignment. The means provided by me, as above, is designed to obviate and prevent said erratic results. By providing, as in this instance, but one slot *h'* for every third type-bar *k* their number is so few as to enable me to extend them to within a very short distance of the impression-point, thereby rendering them efficient as a guide for the free ends of *k*. The type-bars *k* being hung somewhat loosely upon *k'*, and their retaining-slots in *j* being also loose, there is little liability of *k* getting fast in *h'*, even though *h'* is made to fit *k* quite closely.

For steadying of *j* and exactitude of position as between it and *b*, *b* is provided with three friction-rollers (one of which *b b* is shown in Fig. 1) set equidistantly around *j*, and which impinge upon a flattened annular projection on *j*.

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

1. The combination, with the containing-basket, of the type-bars of a type-writer, substantially as described, means, substantially as described, for rotating the same, and means, substantially such as the arm *x*, having a projection *x'*, the elbow-lever *r*, having a tooth *y*, and the stop-peg *z*, for arresting the same.

2. The combination, with the containing-basket constructed so as to be capable of rotation, of the type-bars of a type-writer, substantially as described, means, substantially as described, for rotating the same, means, substantially as described, for arresting the same, and means, substantially such as the spring *a a* and stop-peg *z'*, for returning and retaining the same.

3. In type-writers, a cap-plate, substantially such as *f*, provided with a series of radial slots, substantially such as *h'*, in combination with a series of type-bars greater in number than said slots *h'*, constructed and arranged as described, so as to be capable of being successively brought coincident therewith, substantially as and for the purpose set forth.

4. The type-bar *k*, having a rounded heel



or edge  $m'$ , a slotted bearing or recess  $m$ , and a flaring mortise inclosed by the limbs  $n$  and  $n'$ , substantially as described.

5 5. The combination of the type-bar  $k$ , provided with the heel  $m'$  and the recess  $m$ , the fulcrum-wire  $k'$ , and the cap-plate  $f$ , for the purpose of retaining said type-bar within certain limits, as set forth.

10 6. The containing-basket of the type-bars of a type-writer, constructed and arranged substantially as described, so as to be capable of rotation, in combination with a series of tongues or levers, substantially such as  $o$ , set radially to said basket, less in number than  
15 the type-bars thereof and adapted so as to be capable each of operating several of said type-bars successively when the same are brought into coincidence therewith.

7. In type-writers, the combination of a rotatable containing-basket constructed and arranged substantially as described, a series of type-bars hung therein, and a fixed cap-plate provided with a series of radial slots less in number than said type-bars, all substantially  
20 as and for the purpose specified.

8. The combination of means substantially such as the loop  $q$ , the tongue  $o$ , and the mortised or notched type-bar  $k$ , substantially as set forth.

In witness whereof I have hereunto subscribed my name in presence of two subscribing witnesses.

LUCIEN S. CRANDALL.

Witnesses:

CHARLES M. CROUSE,  
H. E. A. DOXSEE.