

(No Model.)

3 Sheets—Sheet 1.

L. S. CRANDALL.
TYPE WRITING MACHINE.

No. 509,794.

Patented Nov. 28, 1893.

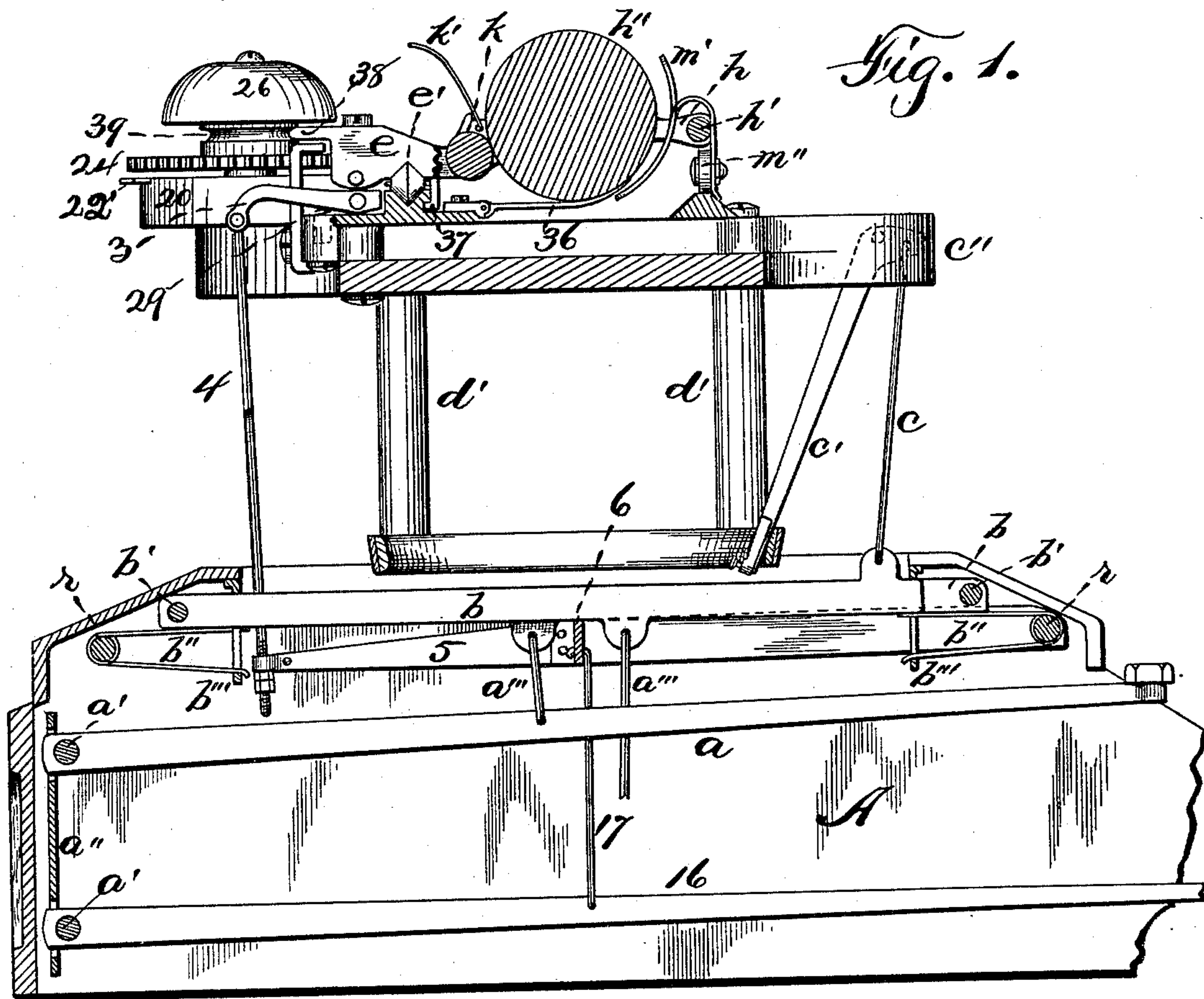
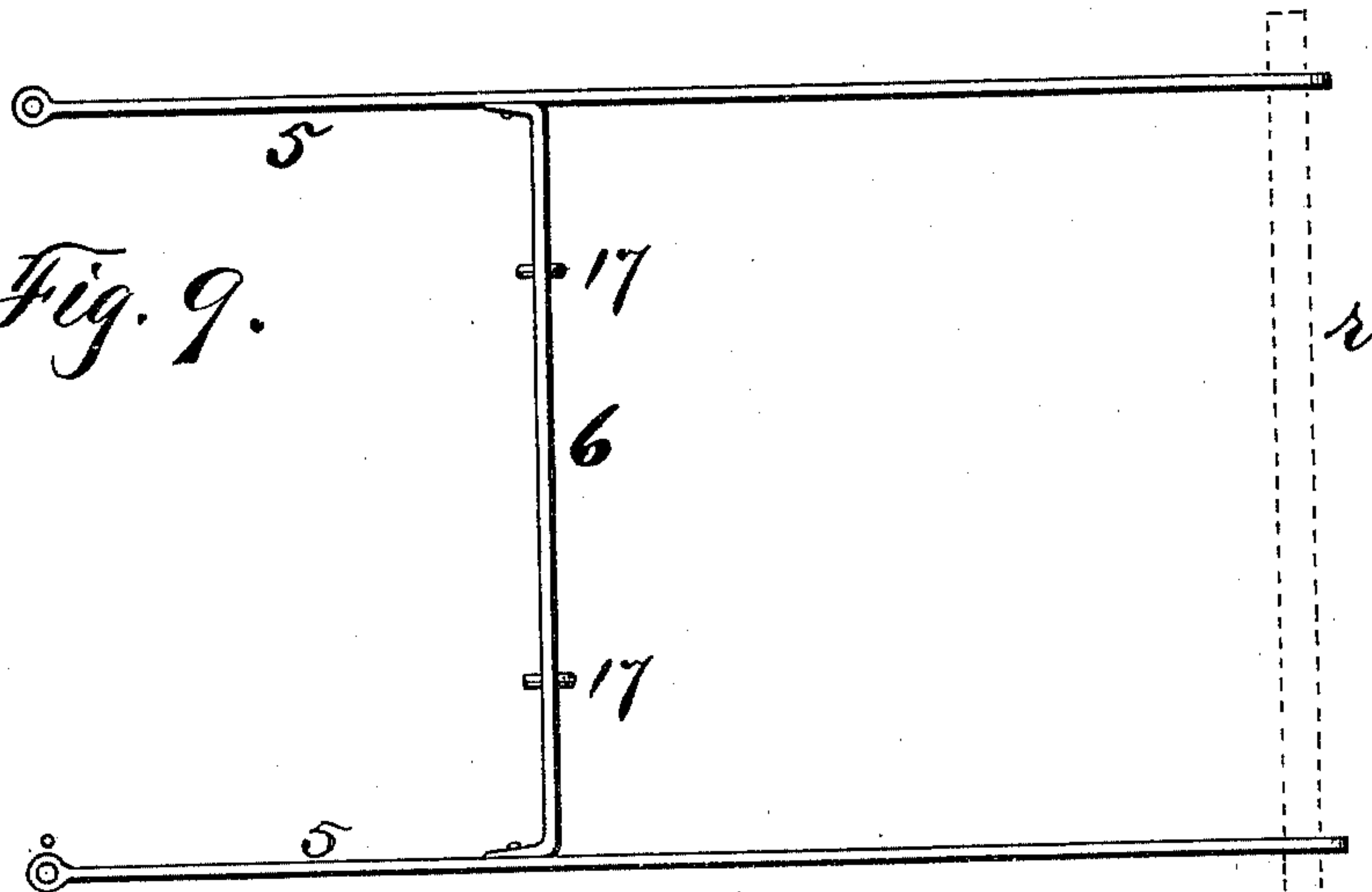


Fig. 9.



WITNESSES:

H. A. Carhart
C. B. Kime

INVENTOR

Lucien S. Crandall

By Smith & Benson

ATTORNEYS.

3 Sheets—Sheet 2.

No. 509,794.

Patented Nov. 28, 1893.



WITNESSES:

WITNESSES:
H. A. Bashart,
B. B. Kinnear

INVENTOR

Lucien S. Crandall.

By Smith & Benson

ATTORNEYS.

(No Model.)

3 Sheets—Sheet 3.

L. S. CRANDALL.
TYPE WRITING MACHINE.

No. 509,794.

Patented Nov. 28, 1893.

Fig. 6.

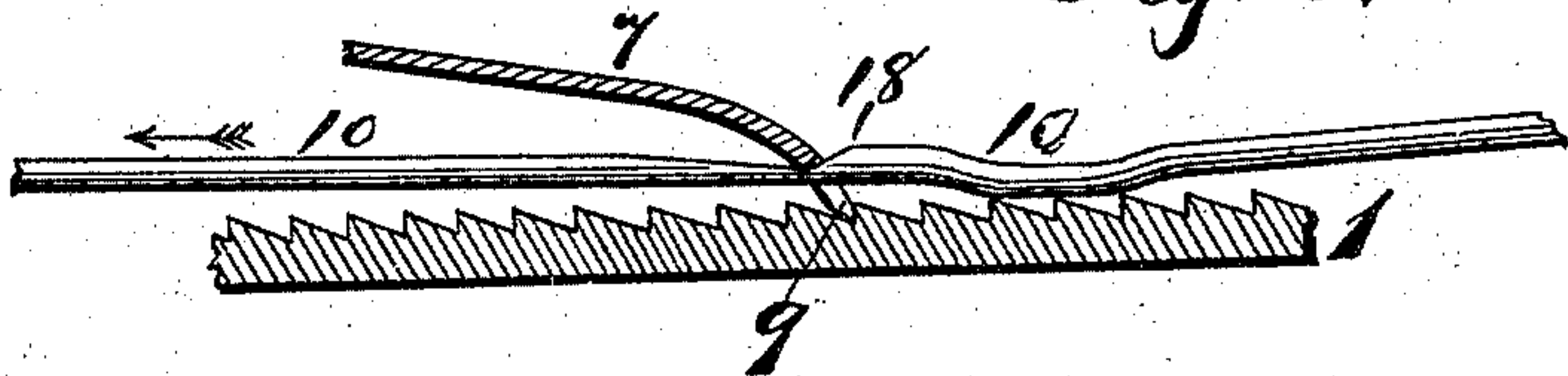


Fig. 7.

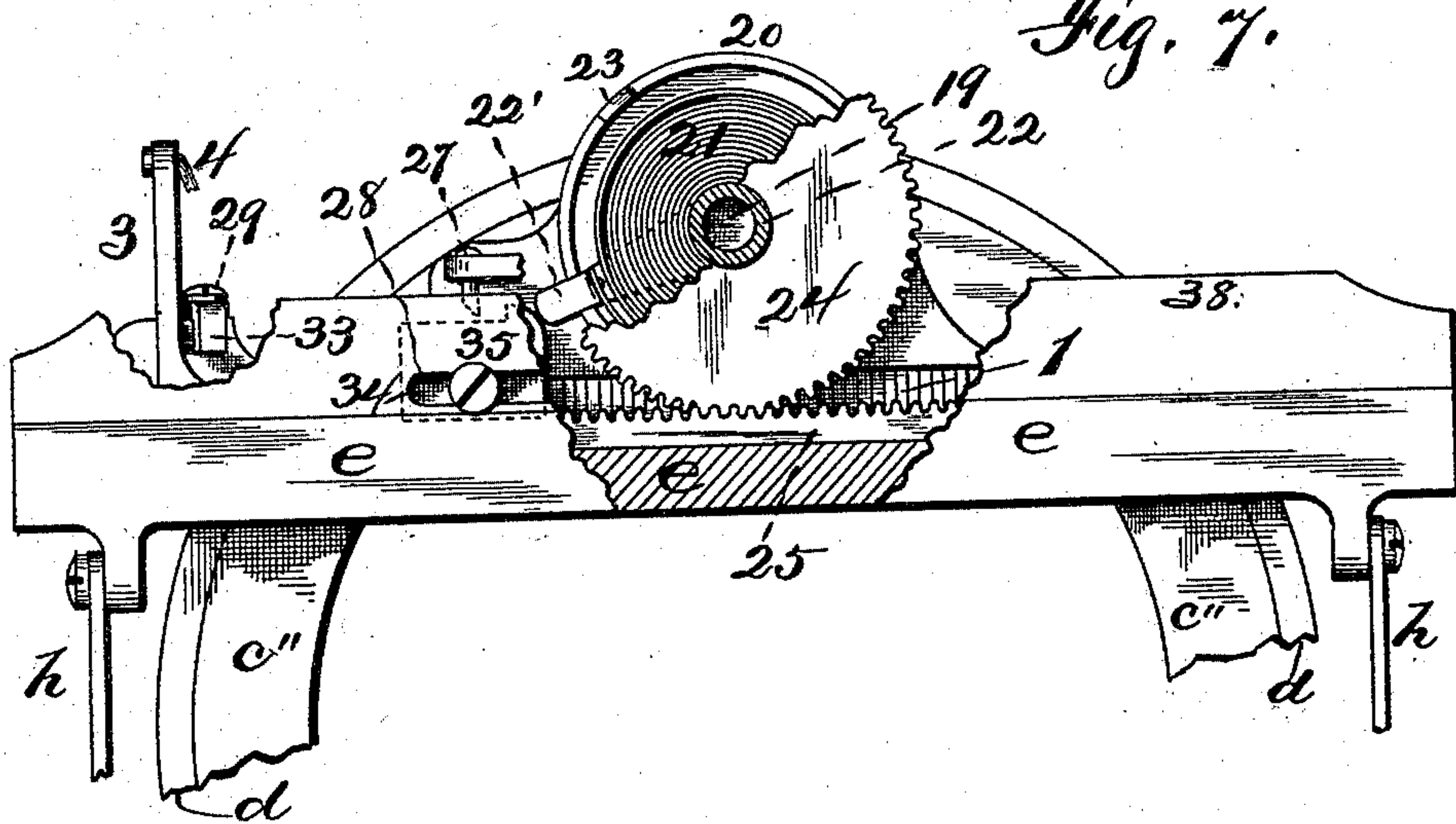
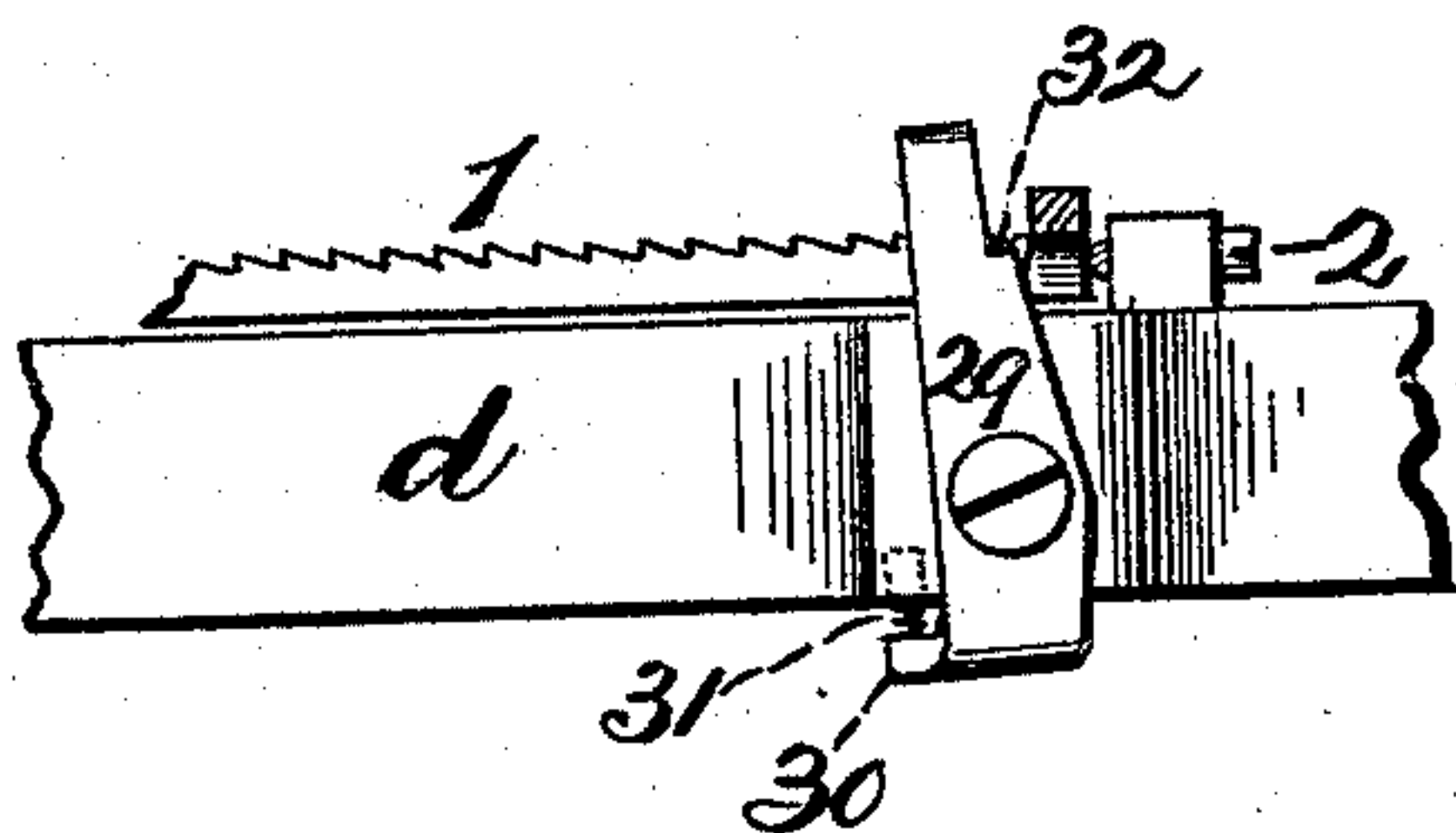


Fig. 8.



WITNESSES:

N. A. Carhart,
C. B. Kimmie

INVENTOR

Lucien S. Crandall.

By

Smith & Thomson

ATTORNEYS.

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. 509,794, dated November 28, 1893.

Application filed January 21, 1893. Serial No. 459,059. (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 mechanism for letter-spacing, carriage traversing and releasing, and its stoppage at the end of a line of printing.

My object is to produce a type-writer with
15 an improved letter-spacing mechanism, comprising a bifurcated pawl, connected to the carriage, a rack-bar having two rows of teeth and mounted upon end trunnions, a crank lever connected to each of said trunnions, and
20 connections therefrom to a spacing bar actuated by the type-arm levers, whereby said rack-bar is rocked in its bearings; with mechanisms whereby said pawl teeth are simultaneously raised entirely out of contact with the
25 rack-bar thereby releasing the carriage from the escapement; with a mechanism whereby the carriage spring is wound up or unwound by the traverse of the carriage by means of a rack-bar upon the carriage and a toothed gear engaging therewith, said gear being mounted
30 upon and adapted to rotate the spring post to which the main-spring is connected; with mechanism whereby the tension of said spring may be varied; and with mechanism whereby the carriage is stopped at the end of
35 a line of printing, by means of a tappet secured upon the carriage adjustably, and a yielding stop pivoted upon the top plate of the machine, with which said tappet engages.

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

45 Figure 1, is a vertical transverse sectional elevation of a type-writing machine, omitting some parts. Fig. 2, is a top plan thereof, partly broken away. Fig. 3, is a rear elevation of the carriage, the top-plate and the escapement rack-bar and pawl. Fig. 4, is a vertical section on line $x x$, in Fig. 3, omitting

the carriage body. Fig. 5, is a top plan of part of the rack-bar pawl, and releasing shaft. Fig. 6, is a vertical sectional elevation, of Fig. 5 longitudinal to the rack-bar. Fig. 7, is a top
55 plan of the rear part of the top-plate and carriage, broken away to show the rack and gear actuating the spring to wind it up or unwind it, and also the means for varying the tension of the spring. Fig. 8, is a detail in elevation
60 of the yielding stop with which the carriage engages at the end of a line. Fig. 9, is a top plan of the spacer bar frame.

A, is the main frame.

— a — is one of the type-bar levers pivoted
65 on the rod — a' — and spaced by the slotted bar — a'' — and connected by the rod — a''' — to one of the auxiliary levers — b —, which are alternately pivoted fore and aft upon rods
70 — b' —, and having springs — b'' — mounted upon the rod — r — and engaging with the auxiliary levers in the combs — b''' — receiving and spacing said auxiliaries; rods — c — connecting the latter to the type-bars — c' — journaled in the type-bar-ring — c'' — mounted in
75 the top-plate — d — which is supported by the posts — d' —; the carriage body — e — mounted upon rollers — e' — in a grooved trackway, a platen frame comprising end rails — h —, front rod — h' —, platen — h'' — suitably journaled in the end rails, feed roller — k — suitably mounted, apron — k' —, guide fingers
80 — m —, front guide — m' —, platen rotating or line spacing lever — n — having an arm — n' — operatively engaging with the platen, and inasmuch as the mechanisms comprised
85 by these several parts are part of the subject matter of other applications for Letters Patent, Serial Nos. 459,057 and 459,058, filed January 21, 1893, no more specific description of
90 them is here given.

The letter spacing mechanism is constructed and operated as follows:

A rack-bar —1— is mounted upon end pivots —2— central to its ends; crank arms —3—
95 are secured thereto adjacent to its ends, and —4— are vertical connecting rods, connected to said crank arms, and to the horizontal spacer bar arms —5—, the front ends of which pass through the front comb — b''' — and are
100 pivoted upon the front rod — r —; and —6— is the spacer bar which is in engagement with the

auxiliary levers —6—, whereby, when a type bar lever is operated and its auxiliary lever is depressed, depressing the spacer bar and pulling down upon the crank arms —3—, the rack-bar —1— is rocked upon its bearings. A spring bar pawl —7— is secured at one end beneath the carriage body, and its other end is slightly bifurcated so as to create pawl teeth —8— and —9— of unequal length, or one (8) slightly in advance of the other the apex of the bifurcating notch being in contact with the releasing rod —10— extending across the carriage and mounted loosely in bearings —11—12— thereon, one end being provided with a spring —13— and the other curving to the front and pivotally connected to the escapement lever —14— pivoted upon a bolt —15— inserted through it, and the line spacing lever —n''—, into an arm (not shown) projecting from the end rail of the platen frame. When the rack-bar is rocked, the long pawl tooth —8— is released from the tooth with which it is engaged, the carriage is shifted (by the spring mechanism hereinafter described) a distance sufficient to bring the long pawl —8— on top of the rack-bar tooth just released from the long pawl —8'— and is caught by the short pawl while the printing is done, and then as the rack-bar rocks back to its normal position, the short pawl is released from its engagement and the carriage travels the remaining tooth space. The long pawl is then in engagement with the next tooth, and the carriage has traveled the distance of one rack-bar tooth, or one letter or word space. The lower lever, marked —16—, on Fig. 1, is the space key lever directly connected to the spacer-bar by the rod —17— and the depression of the space key, rocks the rack-bar the same as when the key-lever is operated, which produced the word-spacing. To release the carriage from the control of the escapement pawl and rack-bar, the rod —10— is provided with a bevel-faced shoulder —18— the base of which is closely adjacent to the apex of the bifurcation in the pawl —7— and then when the lever —14— is operated to draw the rod —10— to the right (Fig. 6) the pawl teeth are raised above and out of engagement with the rack-bar, and the carriage is free to be traversed either way independent of the escapement.

The carriage spring mechanism is constructed and operated as follows:

A standard —19— is erected upon the top-plate at the rear end substantially central to the length thereof, and —20— is a spring case loosely mounted upon said standard, containing the spring —21—, the inner end of which is connected to the sleeve —22— loose on said standard, by any ordinary connection, its outer end being secured to a lever —22'— pivoted upon said standard and outwardly engaging with one of a series of notches —23— cut into the edge of the spring case, so that the tension of said spring may be varied by shifting said lever from one notch to an-

other. The gear —24— is secured to said sleeve and engages with a rack —25— secured to said carriage-body, so that the traverse of the carriage rotates said gear, and winds up or unwinds said spring according to the direction of its movement. At the beginning of a line of printing, if the carriage is released from the escapement rack-bar either entirely by the lifting of the pawl, or partially by the rocking of the rack-bar, said spring tension is exerted to move the carriage to the left, for shifting, or for letter or word spacing. The bell —26— is secured upon the top of said standard, and —27— is the hammer, adapted to be operated to give an alarm by the engagement therewith of the tappet —28—, secured upon the carriage, said alarm-sounding mechanism being also part of the subject matter of another application filed concurrent herewith.

The carriage-stopping mechanism as at the end of a line, is constructed and operated as follows:

A stop —29— is pivotally mounted upon the rear of the top-plate, having an arm —30— extending under the edge of said plate, and a spring —31— interposed between them, said stop being provided with a shoulder —32— and a top arm —33— projecting forward, said shoulder being adapted to be forced under the crank arm —3— and thus lock said crank arm so that it cannot be operated to rock the rack-bar as aforesaid. This stop is so operated when by the traverse of the carriage the tappet —28— is brought into contact with said stop. Also said tappet is adjustable by means of the slot —34— and screw —35—. The pointer —36— (Fig. 1) extending forward under the platen, the hook —37— upon the carriage engaging with the lower track-way, and the rearward extension —38— of the carriage-body, engaging with the groove —39— in the sleeve —22— above the spring gear, are all fully described as to construction and operation in the concurrent applications aforesaid.

It will be seen that in the escapement, while the rocking of the rack-bar throws one pawl tooth out of engagement, the other remains in such position that there can be no skipping of teeth, and irregular spacing; that the release of the carriage is positive and free; that the spring wheel feed action is positive, avoiding the use of all cords, chains or pulleys by its direct rack and gear connection to the carriage; and that the yielding stop takes off all the concussion upon the carriage.

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

1. In a type-writer, the combination with a traversing carriage, of a spring pawl connected thereto, and having teeth of unequal length, a rack-bar mounted upon end pivots and means to rock it.

2. In a type-writer, the combination with a traversing carriage, and a pawl connected

thereto and bifurcated and provided with teeth of unequal projection, of a rack-bar mounted and adapted to rock upon end pivots.

- 5 3. In a type-writer, a rocking rack-bar operatively connected to the type-bar levers and the space-key, in combination with a pawl having pawl-teeth of unequal length in engagement with the rack-bar.
- 10 4. In a type-writer, a letter or word-spacing mechanism comprising a toothed rack-bar mounted upon end pivots, a pawl having teeth of unequal length alternately engaging with said rack-bar teeth, crank arms secured to the rack-bar, a frame supporting the spacer-bar, and connections between it and said crank arms, in combination with the type-bar levers and spacing key.
- 15 5. In a type-writer, the combination with the rack-bar and escapement pawl having teeth of unequal projection, of a shouldered reciprocating rod engaging with said pawl to raise it out of said engagement, and a lever connected to and actuating said rod.
- 20 6. In a type-writer, the combination with the bifurcated escapement pawl and the rack-bar, of a shouldered reciprocating rod passing through said bifurcation, and a lever connected to and actuating said rod.
- 25 7. In a type-writer, the combination with the bifurcated escapement pawl, and the rocking rack-bar, of a reciprocating rod passing

through said bifurcation and provided with a beveled shoulder engaging with said pawl, a lever connected to and actuating said rod 35 longitudinally, and means to return said rod to its normal position.

8. In a type-writer, the combination with the carriage and the rack secured thereon, of a standard, a sleeve thereon, a gear secured 40 to said sleeve, a spring having one end connected to said sleeve, and a lever pivoted on said standard and connected to the outer end of the spring and detachably engaging with the spring-inclosing case.

9. In a type-writer, the combination with the carriage and a tappet mounted thereon, of a pivotally mounted and yielding stop with which the tappet engages at the end of a line of printing, provided with an arm and hav- 50 ing a spring between it and the top plate.

10. In a type-writer, the combination with the carriage, and a tappet adjustably mounted thereon, of a pivotally mounted and yield- 55 ing stop with which the tappet engages at the end of a line, provided with an arm and having a spring between it and the top plate.

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.