(No Model.)

4 Sheets—Sheet 1.

C. E. TILTON.

TYPE WRITING MACHINE.

No. 409,128. Patented Aug. 13, 1889.

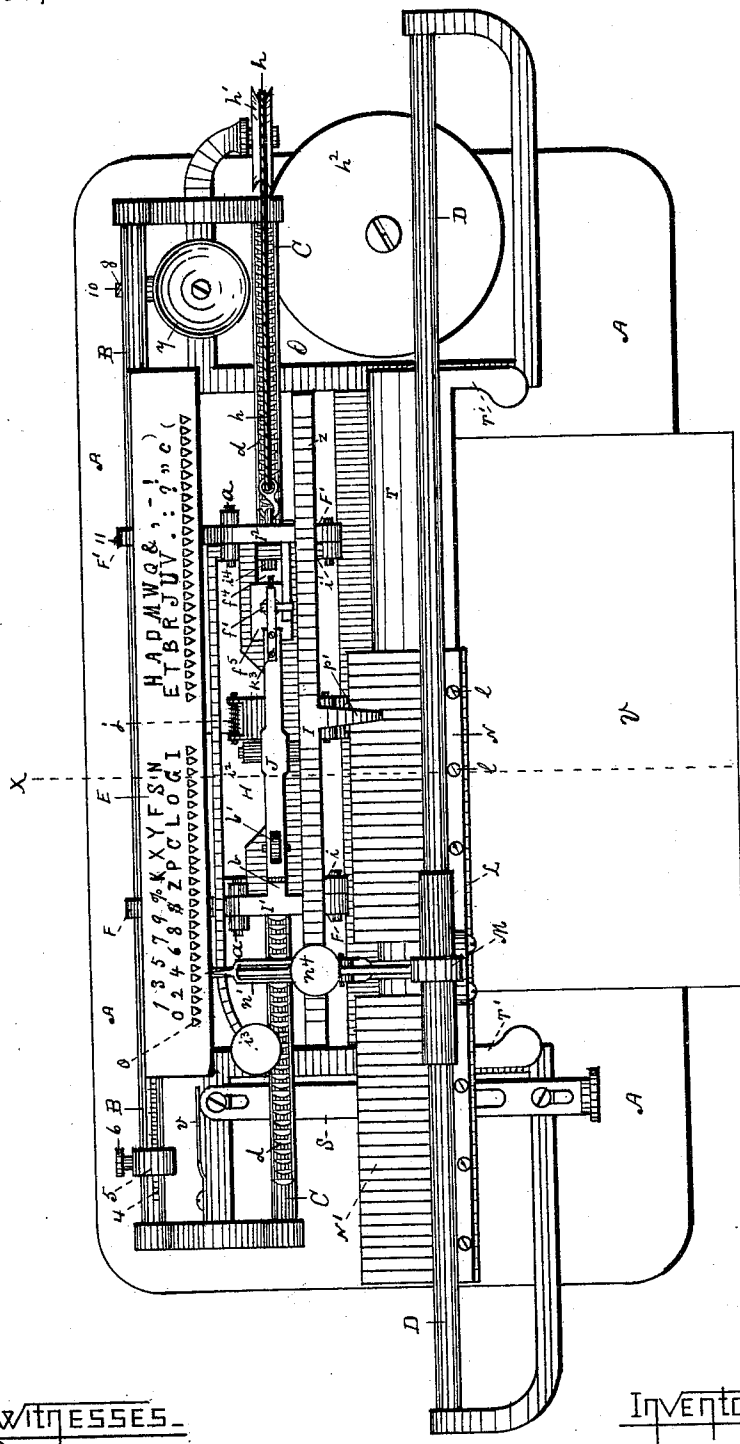


FIG. 1.

Witnesses.

Thomas C. Sinclair

W. H. Ellis

Inventor.

Chas E Tilton

(No Model.) 4 Sheets—Sheet 2.

C. E. TILTON.

TYPE WRITING MACHINE.

No. 409,128. Patented Aug. 13, 1889.

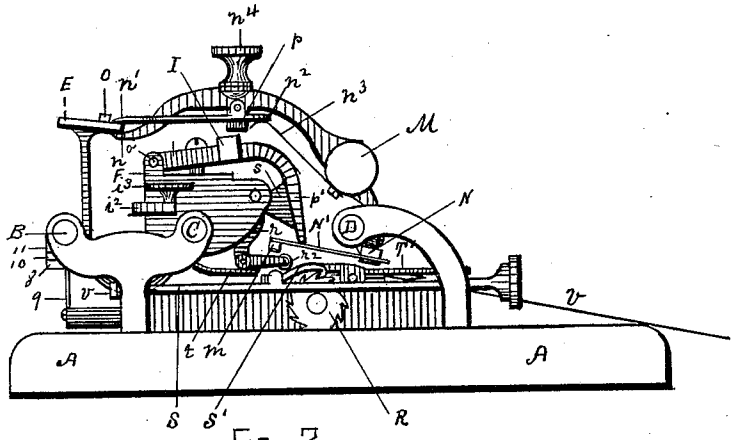


FIG. 2.

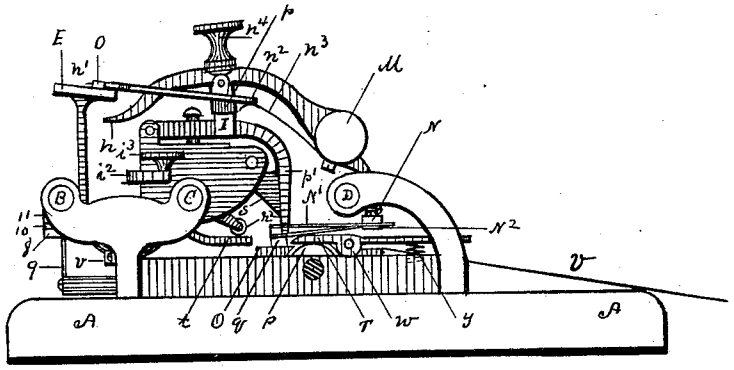


FIG. 3.

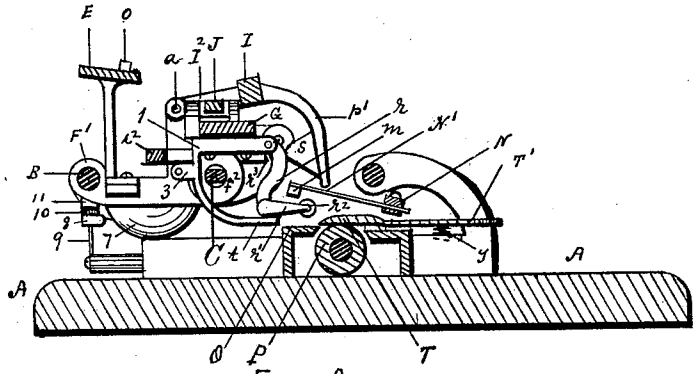


FIG. 4.

WITNESSES.

Thomas C. Orndorff.
K. H. Ellis.

INVENTOR.

Chas E. Tilton.

(No Model.) 4 Sheets—Sheet 3.

C. E. TILTON.

TYPE WRITING MACHINE.

No. 409,128. Patented Aug. 13, 1889.

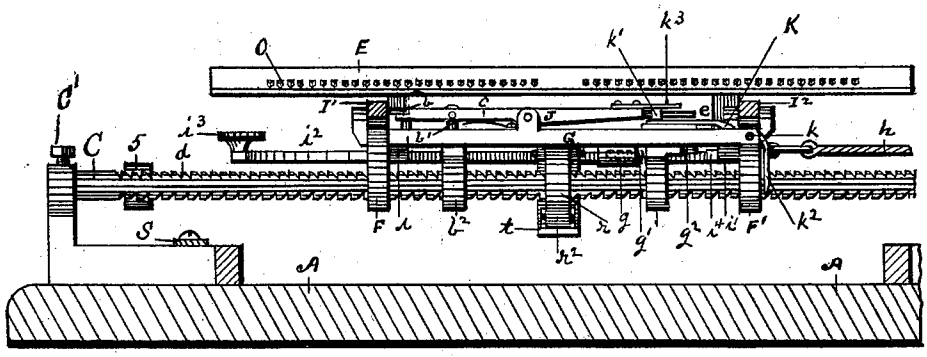


FIG. 5.

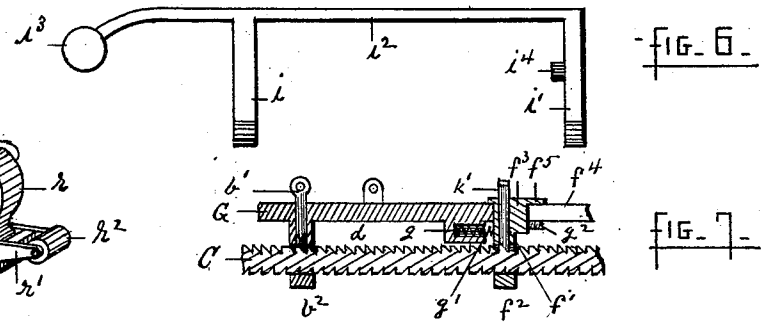


FIG. 6.

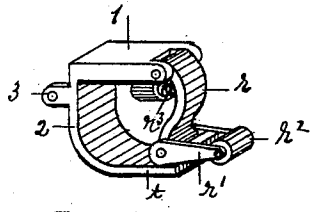


FIG. 12.

FIG. 7.

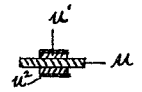


FIG. 11.

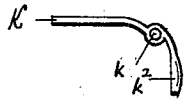


FIG. 8.

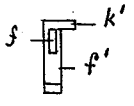


FIG. 9.

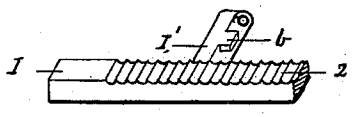


FIG. 10.

Witnesses.

Thomas C. Orndorff

H. H. Ellis

Inventor.

Chas. E. Tilton

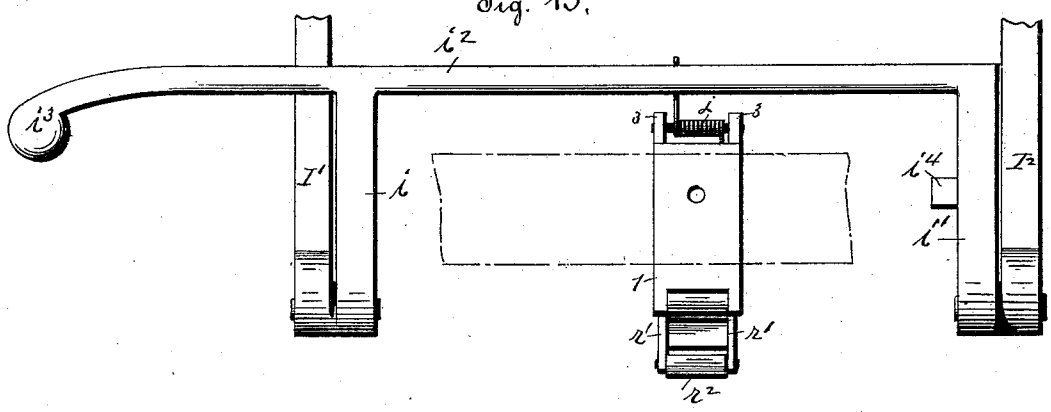
(No Model.) 4 Sheets—Sheet 4.

C. E. TILTON.

TYPE WRITING MACHINE.

No. 409,128. Patented Aug. 13, 1889.

Fig. 13.



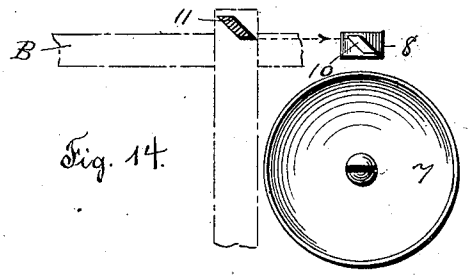


Fig. 14.

Witnesses
Chas. F. Schmelz.
H. M. Fowler.

Inventor
Charles E. Tilton,
By his Attorney
Rufus B. Fowler.

UNITED STATES PATENT OFFICE.

CHARLES E. TILTON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE TILTON MANUFACTURING COMPANY, OF PORTLAND, MAINE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 409,128, dated August 13, 1889.

Application filed December 19, 1884. Serial No. 150,777. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. TILTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Type-Writing Machines, of which the following is a specification, with accompanying drawings, forming part of the same, illustrating a type-writing machine embodying the several features of my invention.

My invention relates to certain improvements in that class of type-writing machines known as "single-key" machines, and especially to certain improvements in the type-writing machine forming the subject of the Letters Patent No. 306,295, granted to me October 7, 1884; and my invention consists in the improved devices and in the arrangement and combination of parts, as hereinafter described, and specifically set forth in the subjoined claims.

The main features of the machine forming the subject of my present invention and that for which the patent above named was granted to me are similar in that in both the paper is held on a platen in position to be printed, and a movable type-bar sliding on a rod serves to bring the desired type into proper position to be struck by a hammer and brought in contact with the paper at the point intended to receive the impression, and also in that the "spacing" for the letters is produced by a stepping motion of the hammer over the paper; but in my present invention important and marked changes are made in many particulars, which are fully and clearly set forth in the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of my improved type-writing machine. Fig. 2 is an end view as seen from the left. Fig. 3 shows a similar view, but with the devices for actuating the feed-roll removed, and showing the position of the several parts at the time one of the type is brought in contact with the platen. Fig. 4 shows a sectional view on line X X, Fig. 1. Fig. 5 is a view of that part of the machine forming the "escapement," the front portion of the machine having been removed. Fig. 6 is a top view of the lever by which the spacing between the words is effected. Fig. 7 is a longitudinal sectional view of a portion of the escapement. Fig. 8 is a detached view of the bent lever by which the carriage is disconnected from the teeth of the rack-bar. Fig. 9 shows the plunger carried in the sliding ring. Fig. 10 shows a portion of the notched bar which receives the pressure of the key. Fig. 11 shows a sectional view of the inking-roll, and Fig. 12 is an isometrical view of the inking device. Fig. 13 is a top view of the spacing-lever, together with the spring by which it is sustained in its normal position. Fig. 14 is a diagram showing the bell and hammer by which the bell is struck, and illustrating the operation of the hammer.

Similar letters refer to similar parts in the several views.

A A denote the base of the machine, upon which, supported by suitable frame-work, are the parallel rods B, C, and D. Upon the rods B and C a carriage slides, carrying an index-plate E, an inking device, and an escapement, by which the proper stepping motion of the carriage is effected, securing the spacing between the letters and words. The carriage consists of the two ends F F′, sliding on the rod C, and extending rearward and inclosing the rod B, and connected together by the bar G. Vibrating upon pivots *a a*, held in lugs extending upward from the ends F F′ of the carriage, is a notched bar I, having arms I′ I² and a curved prong or arm forming the "hammer." From the inside of the arm I′ a spur *b* projects over and rests upon the end of the lever J, pivoted in lugs extending upward from the central section of the bar G. One end of the lever J carries the plunger *b′*, and is held up by the spring *c* on the bar G. The plunger *b′* slides in a ring *b²*, attached to the bar G and inclosing the rod C, and its lower end is beveled and adapted to engage the notches *d* in the rod C and hold the carriage from sliding on the rod. The opposite end of the lever has a rod *e*, which passes through a slot *f* of the plunger *f′*, Fig. 9. The plunger *f′* has its lower end adapted to engage the notches *d*, and slides in a ring *f²*, which in-

closes the rod C, and has an arm f^3 extending up and sliding in a slot f^4 in the bar G, with a flange f^5 resting on the upper surface of the bar G. Held in a socket g on the under side of the bar G is a spring g', pressing against the ring f^2. To the carriage is attached the cord h, which is carried over the scored pulley h' and attached to the periphery of the larger scored drum h^2, within which I place a coiled spring, (not shown in the drawings,) whose tension shall act to wind the cord h upon the drum h^2 and draw the carriage to the right along the rods B and C.

In the normal position of the operating parts the plungers are as shown in Fig. 7, the carriage being held stationary by the plunger f' engaging one of the notches d. If the notched bar I be pressed down, the projecting spur b on the arm I' will press down that end of the lever carrying the plunger b' into one of the notches d and hold the carriage, while the upward motion of the opposite end of the lever will withdraw the plunger f', allowing the spring g' to move the ring f^2 the distance of one or more notches, as may be determined, the arm f^3 sliding along the slot f^4 in the bar G. If the pressure be removed from the notched bar I, the spring c will act to carry that end of the lever, together with the bar I, upward, withdrawing the plunger b' and allowing the plunger f' to engage a notch in advance of its former position, when the spring coiled in the drum h^2, overcoming the tension of the weaker spring g', will move the carriage forward. The carriage in its forward movement is stopped by means of the ring f^2 and has a forward stepping motion at every vibratory motion of the notched bar I and of the lever J.

It will be seen that the carriage will move at each forward motion a distance that will be a multiple of the space from one of the notches d to the next. The rod C is held in the frame of the machine, and is capable of being turned in its bearings, but is held in position by means of a set-screw C', Fig. 5. Upon the lower side of the rod C is a series of notches having the distance from one notch to the next adjacent notch greater than the distance from one of the notches d to the next notch. By turning the rod C half-way round the lower set of notches are brought uppermost in the position occupied by the notches d, and the spacing between each of the letters will then be increased to correspond with the greater space between the notches. In the same manner other series of notches can be placed upon the rod C and other varieties of spacing between the letters secured. I am thus enabled to give a greater spacing between all the letters in the words of any given sentence to take the place of italicizing the same.

Pivoted to the ends F F' are the arms i i', Fig. 6, connected by a lever i^2, terminating in a knob i^3. From the arm i' a spur i^4 projects, against which the screw g^2 strikes at each forward motion of the ring f^2, caused by the spring g', thereby limiting the motion of the carriage at each step. The screw g^2 is held in the arm f^3 and permits an adjustment to vary the "steps" of the carriage. The spiral spring j, Figs. 1 and 13, is coiled upon a pin. Supported in lugs at the back of the carriage is a torsional spiral spring held upon a pin to which one end of the spring is attached, while the free end of the spring extends to the rearward under the lever i^2 and holds the lever i^2 and stud i^4 in proper position to receive the screw g^2. When it is desired to increase the stepping motion of the carriage—as, for instance, between the words—the knob i^3 may be pressed downward, thereby lowering the spur i^4 and allowing the screw g^2 to move forward against the arm i'. A bent lever K, pivoted at k in the end F' of the carriage, has its horizontal arm carried beneath an arm k' on the plunger f' and its vertical arm terminating in a button-shaped end k^2, by which the operator may raise the plunger f' independently of the lever and move the carriage back in position to begin a new line, the blade-spring k^3 on the lever serving to return the plunger into one of the notches d. Upon the rod D is a sliding sleeve L, to which are attached the curved key M and the bar N, between which and the plate N^2 are clamped by the screws l a series of elastic blades N', each of the elastic blades carrying upon its opposite end and under side a type, as shown at m, Figs. 2, 3, and 4. The point n of the key passes over the carriage and extends beneath the index-plate E. To the central section of the key I pivot a finger with its longer arm n' extending forward and resting upon the front edge of the index-plate E, and against the end of the shorter arm n^2, I bring the action of a spring n^3, attached to the key, which causes the points n and n' to grip the edge of the index-plate, and also allows the operator, by pressing upon the knob n^4, to carry the key M downward, as shown in Fig. 3, the finger-point n' moving forward and between the V-shaped studs o on the plate E, rocking the sleeve L on the rod D, and bringing the elastic type-carrying blades N' from an inclined to a horizontal position, as illustrated in Fig. 3, while at the same time the arm p on the under side of the key M is brought against the notched bar I, carrying it down and bringing the curved prong p', forming the hammer, upon one of the elastic blades N', carrying it downward in advance of the remaining blades, as at q, Fig. 3, and causing its attached type to press against the platen O. The several types and their elastic blades are so arranged relatively to the finger n' that when the finger is brought into proper position to pass through an opening between any of the V-shaped studs o, as indicated by the character it is desired to print, that elastic blade bearing a similar type will be brought into proper position to

be struck by the hammer p'. Directly back of the prong or hammer p', I hang a swinging curved plate r, pivoted at its upper end in lugs attached to the carriage and having at its lower end a forked frame r', carrying a small roll r^2, covered, preferably, with felt. A spring r^3, resting in a socket behind the curved plate r, holds the plate against the blade s, projecting from the hammer p', and carries the ink-roll forward beneath the elastic type-carrying blades N', as shown in Figs. 2 and 4, and as they are brought down by the rocking motion of the sleeve L the face of the type are brought low enough to receive the contact of the ink-roll as it moves back into the position shown in Fig. 3 through the action of the blade s moving inward and downward over the curved surface of the swinging plate r, which is suitably shaped to secure the rapid withdrawal of the ink-roll from beneath the type in time to allow that one brought beneath the action of the hammer to pass down and come in contact with the platen. As the ink-roll is moved back, it is carried over an inking-plate t, which may have an ink-pad upon it or ink otherwise distributed over its upper surface, so that the ink-roll r^2 as it moves back will be made to roll by contact over the inked surface and be sufficiently supplied to properly ink one of the types in its next reciprocating motion.

In Fig. 12 is shown the construction of one form of an inking device embodying the features of my invention. The plate 1 is attached to the under side of the bar G, Fig. 4, and to its front edge I pivot the curved plate r, and extending downward from its rear edge is a curved plate 2, which forms at its lower end an inking-plate t, while in the lugs, one of which is shown at 3, I support upon a pin the spring j, Fig. 1.

The ink-roll is shown in sectional view in Fig. 11, and consists of a pin u, which extends through and turns in the arms of the forked frame r', and upon which a short piece of metallic tube u' is pressed tight enough, so that both tube and pin will turn together. A porous covering u^2 is then placed over the metallic roll so formed to act as an absorbent of the ink. This form of roll is easily removed, when it becomes worn or hardened by continued exposure, by driving out the pin from both the tube and frame r'.

The platen O is a bar extending lengthwise of the machine and forming also a portion of its frame-work, with its upper horizontal surface arranged in proper position to receive suitable pressure from the types when they are brought down by the action of the hammer. Immediately in front of the platen O is a roll P, preferably provided with a roughened or a yielding surface, journaled in suitable bearings in the frame-work of the machine and carrying a ratchet-wheel R, actuated by a sliding push-bar S and pawl S', a spring v returning the bar and pawl to engage the succeeding tooth upon the ratchet. Extending over the roll P is a plate T, pivoted to the frame at its ends by lugs, one of which is shown at w, Fig. 3, and having its under surface tangential to the periphery of the roll and substantially parallel with the platen O. Arms T' T' at the front and ends of the plate T have springs y placed beneath them, by which the tangential surface of the plate T is firmly pressed upon the roll P. The paper to be printed, as seen at V, Figs. 1, 2, and 3, has its edge placed under the plate T and is pressed into the acute angle formed by the under surface of the plate T and the roll P. A forward motion is then given to the roll by means of the push-bar and ratchet, and the paper will be carried forward over the platen O, thereby obviating the necessity of raising the plate T in order to insert the paper between it and the roll. The paper as it is fed to the machine passes beneath the plate T, by which it is held from curling or rolling, and by the pressure of the plate it is held upon the roll P in substantially tangential contact. At each intermittent motion of the roll P the paper is carried forward and projected over the surface of the platen c without producing any curvature in the paper, which in the case of heavy paper or card-board would materially impede its progress between the roll and plate. These objects can obviously be attained by the employment, in lieu of the plate T and springs y, of a plate of an elastic material attached at one side to the frame-work of the machine and extending over and resting upon the top of the roll with a yielding pressure and in the same relative position to the roll and platen as the plate T. Such a construction I therefore deem to come within the scope of my invention. The forward motion of the roll the space of one of the teeth on the ratchet R determines the space between the lines.

In case the paper is to be removed from the machine, the plate T may be lifted from the roll P by pressing on the arms T' T'.

I am aware that a roll and a pressure-plate by which the paper is held against the roll, said pressure-plate being curved concentrically with the surface of the roll, have been heretofore used; also, that a bar forming a part of a pivoted bail has been used, said bar pressing upon the surface of the feed-roll. I claim none of these devices as a part of the feeding mechanism of my improved type-writing machine, in which the paper is held against the under surface of a plate parallel with the platen and tangential with the feed-roll, by which the paper is moved along the surface of the pressure-plate by the frictional contact of the roll.

On the rod B, I place the graduations 4, Fig. 1, by which the position of the carriage may be determined and by which the collar 5 may be set by means of the set-screw 6, so as to allow the carriage to be brought back to the same point at the beginning of each line.

7 denotes a bell, which is attached to the frame or stationary part of the machine.

8 is a hammer mounted upon the upper or free end of a blade-spring 9, attached at its lower end to the frame.

10 is a projection extending upwardly from the top of the hammer 8, the plane of the projection 10 being placed obliquely to the line of motion of the carriage.

11 denotes a blade-shaped projection attached to the end F′ of the reciprocating carriage, and the projection 10 is placed in the path of the projection 11, which is also placed obliquely to the line of motion of the carriage, so that as the projection 11 passes the projection 10 it will move the projection 10 and hammer 8 outwardly, bending the blade-spring 9. As the projection 11 leaves the projection 10, it is suddenly released, allowing the tension of the spring 9 to carry the hammer 8 against the bell 7, and thus indicating the end of the line.

As the carriage is moved back to the starting-point, the oblique blade 11 on the carriage passes in the rear of the oblique blade 10, carrying the hammer forward a short distance, but not far enough to bring it in contact with the bell.

A series of notches z upon the upper surface of the bar I guides the arm p as the key is pressed down, so that the proper position of the types may be determined and the hammer prevented from striking two of the type-carrying blades at the same time.

I am aware that type-writing machines have been described having elastic bars with type attached to their free ends; also, that inking-rolls have been employed in type-writing machines to pass over the face of the type. Such I do not claim, broadly.

Having thus described my invention, what I claim is—

1. The combination, with a carriage having a reciprocating motion in a right line and elastic type-bars attached to said carriage, of a carriage capable of an intermittent motion, a hammer p', notched bar I, pivoted on the carriage, having an intermittent motion, key M, attached to said type-bar carriage, and arm p, attached to said key, substantially as described.

2. The combination, with the stationary rod D and type-bar carriage having a reciprocating motion on said rod, of elastic type-bars N′, types m, attached to said elastic bars, key M, pivoted pointer n', arm p, hammer p', notched bar I, and index-plate E, having spurs o, substantially as described.

3. The combination, with the type-bar carriage carrying elastic type-bars N′ and key M, of a hammer-carriage having an intermittent motion, hammer p', notched bar I, provided with arms I′ I², pivoted on the hammer-carriage, projection b, lever J, and spring c, and an escapement mechanism, substantially as described, and operated by the lever J, substantially as described.

4. The combination, with a carriage having a rocking motion about a horizontal axis and having a series of type-bars attached thereto, of a key M, hammer p', notched bar I, arm p, attached to the key M, blade s on hammer p', curved swinging plate r, spring r^3, pivoted arms r', ink-roll r^2, and inking-plate t, substantially as described.

5. The combination, with a type-bar carriage having a rocking motion about a horizontal axis, of elastic type-bars N′, types m on the under side of the free ends of said bars, key M, arm p, hammer-carriage carrying a hammer p' and a notched bar I, blade s on said hammer, swinging plate r, arms r', carrying roll r^2, and spring r^3, by which the roll r^2 is carried beneath the type-bars, said blade s, swinging plate r, roll r^2, and types m being all relatively so arranged that the rocking motion of the type-bar carriage carries the types m into the path of the roll r^2 prior to the rearward motion of said roll over the types m as actuated by the blade s upon said swinging plate r, whereby the tension of the elastic type-bars is caused to press the types upon the roll r, substantially as described.

6. The combination, with a type-bar carriage having a horizontal reciprocating motion and a hammer-carriage having an intermittent reciprocating motion, of key M, carried by the type-bar carriage-arm p, and pivoted pointer n', index-plate E, and notched bar I, carried by the hammer-carriage and having notches corresponding with the characters upon said index-plate, substantially as described.

7. The combination, with an index-plate E, having V-shaped teeth, and an arm or key M, having its end n resting against the under side of the index-plate, of a finger or pointer pivoted to said arm or key and having the end of its longer arm n' resting on the upper side of the index-plate, and a spring attached to the arm or key and pressing against the shorter arm of the pivoted finger, substantially as described.

8. The combination, with the hammer-carriage carrying a hammer p' and notched bar I, having arms I′ I², of the projection b, lever J, spring c, plunger b', ring f^2, plunger f', spring g, and notched rod C, said rod being capable of being reversed or turned in its bearings, and having notches on opposite sides, of varying spaces, substantially as described.

9. In a type-writing machine, the combination, with a carriage carrying a hammer pivoted thereto and adapted to press the type upon the platen, and a notched bar or rod, and mechanism, substantially as described, by which said carriage is moved along the notched bar or rod, of an "escapement" consisting of a lever pivoted on said carriage, plungers connected to the ends of the lever and sliding in ways, so as to be alternately connected with and disconnected from the notched bar or rod by the action of the lever,

one of said plungers being carried in a sliding block actuated by a spring, whereby it is carried along the notched bar or rod independently of the carriage, together with mechanism for actuating the lever as each letter is printed, substantially as described.

10. The combination, with the carriage of a type-writing machine having motive power connected therewith, of the pivoted lever J, spring c, plungers b' and f', sliding ring f^2, spring g', and notched bar C, substantially as described.

11. In a type-writing machine, the combination, with a hammer-lever carriage, of an escapement consisting of a lever having plungers connected with its ends and engaging a rack bar or rod, one of said plungers having a sliding motion along the rack bar or rod independently of the other, said plunger being slotted at its connection with the lever, substantially as described, and a lever K, adapted to lift said slotted plunger independently of the action of the lever, whereby both plungers may be disengaged from the rack-bar, substantially as described.

12. In a type-writing machine, the combination, with a hammer-lever carriage having a ring f^2, sliding in a slot f^4 of lever J, and carrying a plunger f' and screw g^2, of a spacing-lever i^2, pivoted by the arms i and i', and having a spur i^4 and a spring j, whose tension is applied to raise the lever i^2, substantially as described.

13. In a type-writing machine, the combination, with a platen to receive the impression of the type, of a feed-roll and a plate with its surface tangential to the surface of said feed-roll and also parallel with said platen, and a spring whose tension is applied to said plate to press it against said feed-roll, substantially as described.

14. In a type-writing machine, the combination, with a platen to receive the impression of the type and a feeding-roll at the side of and parallel with said platen, of a plate held by the frame of the machine upon the side of the feeding-roll opposite said platen, the under surface of said plate presenting a plane surface in tangential contact with the feeding-roll and substantially parallel with said platen and exerting a yielding pressure upon said roll, whereby the paper is held from curling or rolling as it passes beneath said plate, substantially as described.

15. In a type-writing machine, the combination, with a hammer-lever carriage having an intermittent or stepping motion, of a blade 11, placed obliquely to the line of motion of said carriage, a bell-hammer supported upon a spring 9 and provided with an oblique blade 10, and a bell attached to the frame-work of the machine, substantially as described.

CHAS. E. TILTON.

Witnesses:
JOSEPH H. WEDGE,
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