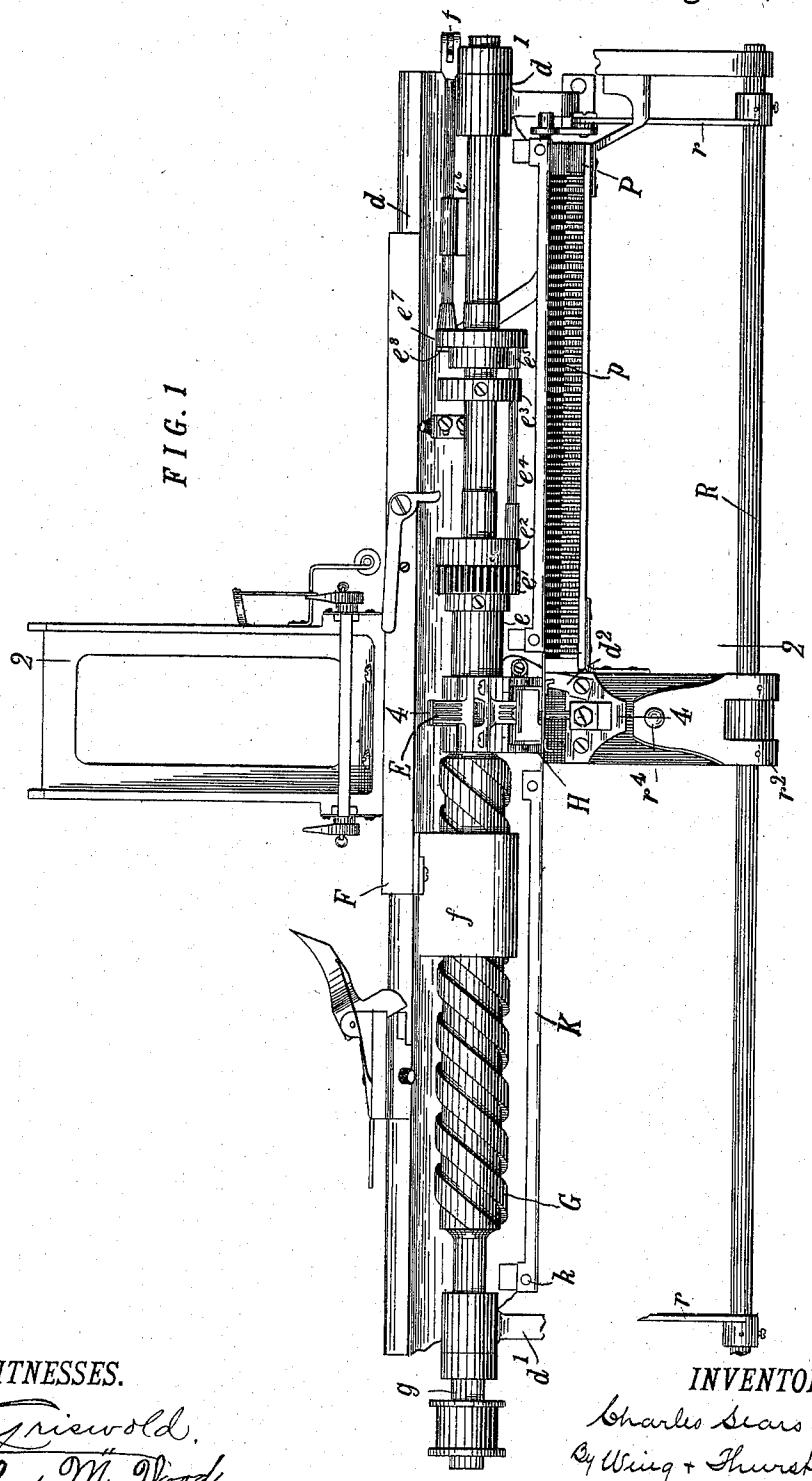
(No Model.) 4 Sheets—Sheet 1.

C. SEARS.

CARRIAGE FEEDING MECHANISM FOR TYPE WRITING MACHINES, &c.

No. 565,694. Patented Aug. 11, 1896.

FIG. 1



WITNESSES.

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FIG. 7

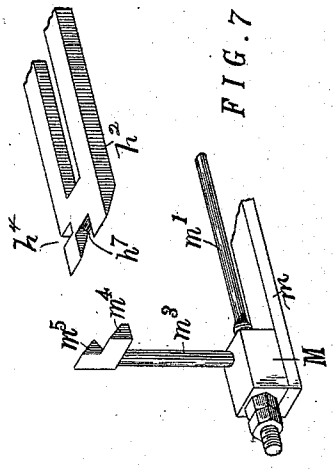

FIG. 2

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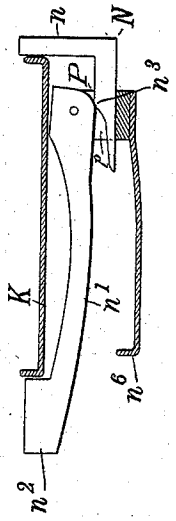

FIG. 6

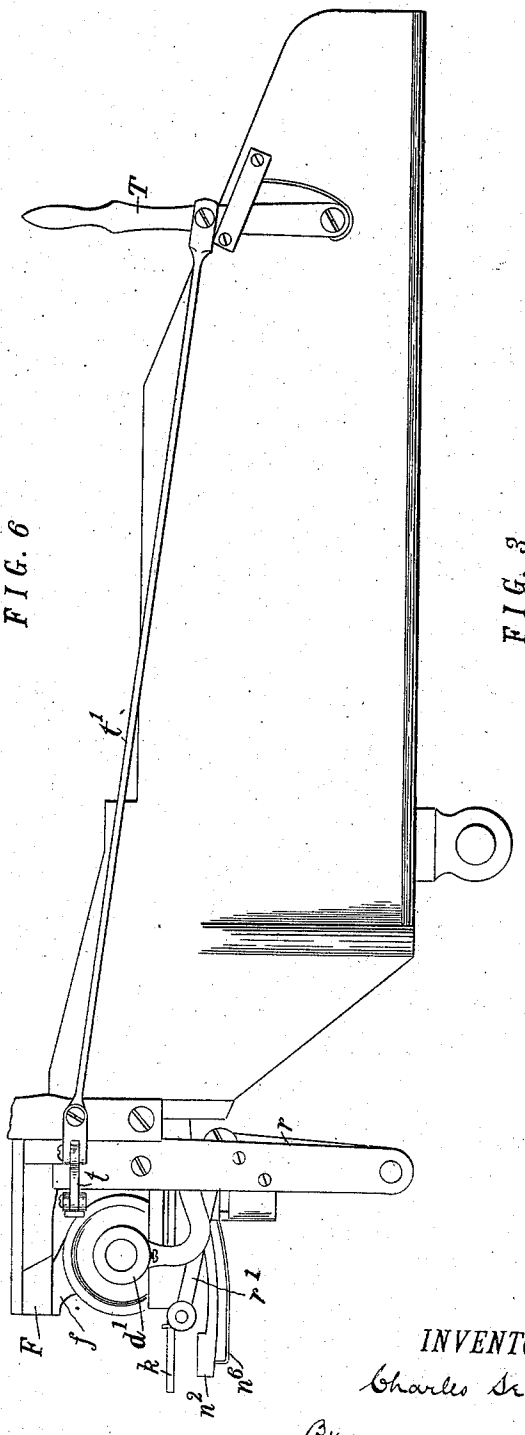

FIG. 3

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FIG. 4

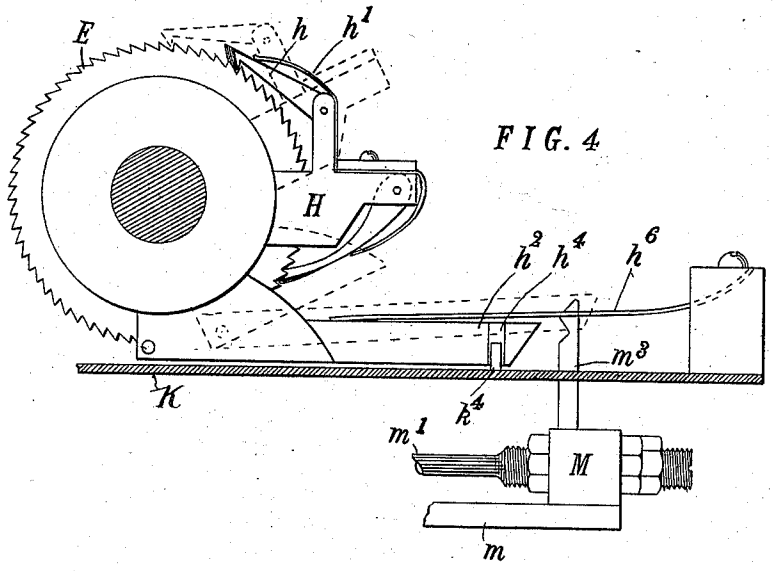
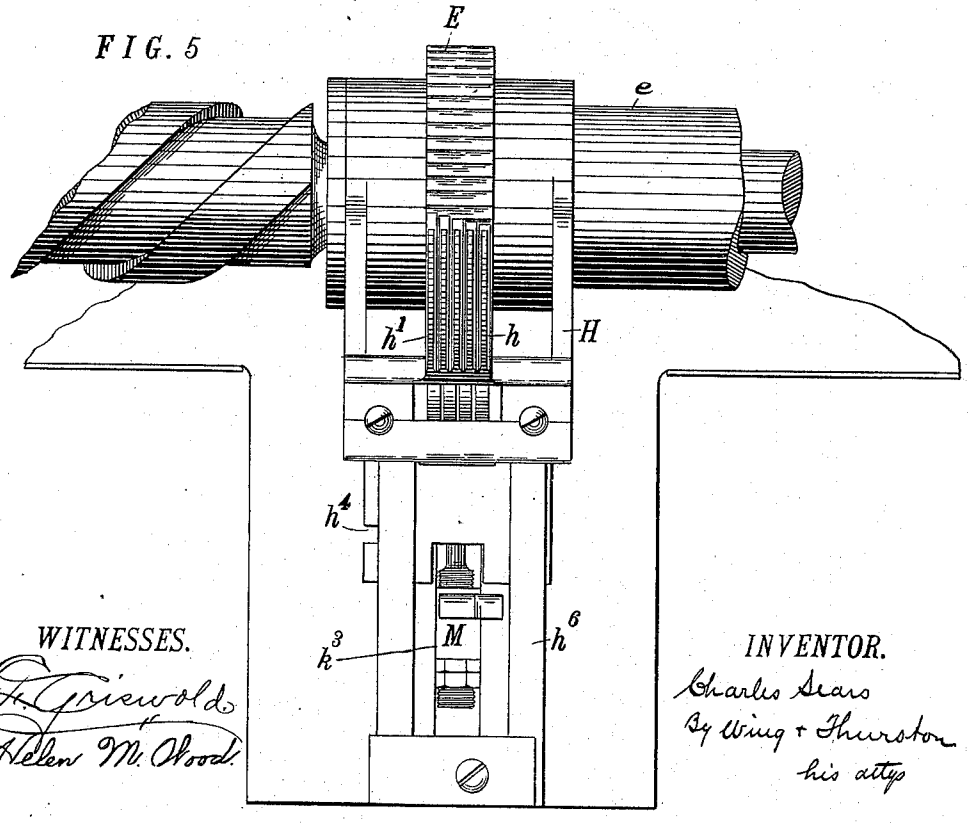


FIG. 5



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UNITED STATES PATENT OFFICE.

CHARLES SEARS, OF CLEVELAND, OHIO.

CARRIAGE-FEEDING MECHANISM FOR TYPE-WRITING MACHINES, &c.

SPECIFICATION forming part of Letters Patent No. 565,694, dated August 11, 1896.

Application filed March 15, 1894. Serial No. 503,798. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SEARS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Carriage-Feeding Mechanism for Type-Writers, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention consists in the construction and combination of parts hereinafter described, and pointed out definitely in the claims.

My invention relates to the mechanism for actuating the carriage of a type-writing machine or a matrix-making machine. The object of the invention is to positively move the carriage step by step as the letters are printed distances proportionate to the width of said letters.

The invention as illustrated in the drawings is connected in and forms a part of a matrix-making machine substantially like that shown and described in the application of Sears and Miller, filed May 27, 1893, and serially numbered 475,680. The use of the invention is not limited to this machine, however, and except for certain details of construction which especially adapt it to said machine the invention may be used in any analogous machine to effect the results to be presently pointed out.

In the drawings, Figure 1 is a rear view of the carriage-feeding mechanism. Fig. 2 is a sectional side view on line 2 2 of Fig. 1, showing one key and the mechanism intermediate of said key and plate. Fig. 3 is a side view of the machine containing my improved mechanism. Fig. 4 is an enlarged sectional side view on the line 4 4 of Fig. 1. Fig. 5 is an enlarged plan of the parts shown in Fig. 4. Fig. 6 is an enlarged sectional view of the plate K, an actuating slide and a stop-lever, the latter being elevated to engage with the rear side of said plate; and Fig. 7 is a perspective view of the slide M and stud m^3 and the rear end of the link h^2.

As before stated, the mechanism constituting the invention is connected in and forms a part of a matrix-making machine substantially like that shown and described in prior patent of Sears and Miller, No. 537,905, granted April 23, 1895.

Referring to the parts by letters, A represents a die, and a' the shank of said die. a represents the case in which said shank is movable.

a^3 represents the slide, to the rear end of which the die-case is pivoted.

C represents the bell-crank lever, having secured to its upper arm a pin c^3, which enters the vertical slot a^9 in the slide a^3. Secured to its lower arm is a pin c^4, which enters a slot b^2 in the key-lever B. The key-lever B is pivoted on the fixed rod b. On the rear side of each case a is a horizontal pin a^{10}.

The parts above described are substantially the same in construction and mode of operation as the similar parts shown and described in the prior application above named, and they constitute what may, for want of a better name, be called "one-character system." There are as many systems substantially like that described as there are characters employed in the machine. The only difference between the several systems which is of any consequence in connection with the carriage-feeding mechanism hereinafter described and claimed is in the length of the pins a^{10} on the rear edges of the cases a; and the lengths of these pins are proportionate to the width of the characters, being in this respect substantially as described in said prior application.

The carriage F is mounted so as to be slidable transversely on a suitable fixed guide d on the rear part of frame D.

Mounted in suitable fixed bearings d' is the feed-screw shaft g, having the feed-screw G formed thereon. This shaft, as shown, lies below and parallel to the transverse path traveled by the carriage. A bracket f is rigidly connected with said carriage, and the feed-screw G screws through said bracket. It is clear that as the feed-screw is turned the carriage is moved, and the amount of such movement will depend upon the extent to which the feed-screw is turned.

Mounted loosely upon the shaft g is a sleeve e, of which the ratchet-wheel E is a part. Clutch mechanism, which will be presently explained, is provided for connecting and disconnecting the sleeve e and shaft g.

A swinging pawl-carrying frame H is mounted on the sleeve *e*, the arms of said frame lying on opposite sides of said ratchet. Pivoted to said frame are the pawls *h*, which pawls are pressed against the ratchet by the independent springs *h'*.

A link h^2 is pivotally connected at its front end with the pawl-carrying frame H. When a force is applied to this link drawing it backward, the frame H is rocked, the pawls sliding upon the edge of the ratchet. Secured to the side of the frame H is a lug h^3. (See Fig. 1.) A set-screw h^5 screws through this lug. When the frame H swings forward, the end of said screw engages with the fixed block d^2, and thereby the movement of the frame is stopped. By adjusting the position of this screw the point at which the frame H stops in its forward movement may be varied.

K represents a plate which is slidable backward and forward on the fixed rods *k*. It extends across the rear side of this machine, so that it may be acted upon by any of the slides N, to be presently explained. Directly behind the ratchet-wheel this plate extends rearward. The rear end of the link h^2 rests upon this plate during a greater part of the time, being held down by the spring h^6, which is secured to said rear projection of plate K. In the link is a slot or hole h^4, into which the pin k^4 projects. The said pin is secured to the plate K. When the link h^2 is engaging, as described, with the pin k^4, the backward movement of the plate K causes the pawl-carrying frame to rock backward, whereby the pawls *h* slide backward on the ratchet E, and the distance which the pawls slide upon said ratchet is dependent upon the amount of backward movement of said plate.

M represents a slide which slides upon the plate *m*. A rod *m'*, which is secured to the slide, extends forward to a point where it is engaged by a cam *l* on the driven shaft L, and the action of the cam on said rod is to draw it and the slide forward. A spring m^2 pushes the rod backward when the cam is in such position as to permit of this movement.

Projecting upward from the slide M through a slot k^3 in the plate K is a stud m^3. On one side of the stud is a bevel surface m^4, which, as said slide moves forward, engages with a beveled rear end of the link h^2, thereby lifting said link out of engagement with the pin k^4. When said link has been lifted as described, a further forward movement of the slide M causes the angular projection m^5 on the stud m^3 to engage in a similarly-shaped recess h^7 in the rear end of the link, (see Fig. 7;) whereupon, as said slide M is moved forward by the action of cam *l* the stud m^3 pushes on the link h^2, and the pawl-carrying frame H is swung forward to its first position, in which position it is stopped by the engagement of the set-screw h^5 with the block d^3. As the pawl-carrying frame moves to this position one of the pawls *h* engages with the ratchet without any appreciable lost motion, and the ratchet, and consequently the feed-screw, is turned. Since the pawl-carrying frame always moves back to the position from which it was moved by the backward movement of plate K, it is apparent that the distance which the feed-screw is turned at any time is proportionate to the distance which the plate K was moved backward.

In order that there shall be no appreciable forward movement of the pawl-carrying frame which does not produce a like movement of the ratchet, I employ nine pawls of different lengths—five above and four below the center. These pawls are so proportioned that they engage successively with the teeth of the ratchet, and the movement of the ratchet backward a distance equal to the length of one tooth causes the nine pawls to engage successively with the ratchet teeth.

The mechanism employed to move the plate K backward will necessarily vary in different machines in which the above-described mechanism may be used. When used in a machine substantially like that shown in the prior application before mentioned, the plate is pushed back by means of the pins a^{10} on the rear sides of the cases *a*.

Just below the plate K are a series of slides N, which lie in grooves *p* in a bar P. On the forward end of each slide is an arm *n*, which lies between and in contact with the plate K and a fixed plate O. Directly in front of each of the slides N there is a hole *o* in the plate O, through which the pins a^{10} pass as the cases *a* are pushed back. Each pin a^{10} strikes and pushes back the corresponding slide N, and each of these slides in moving backward pushes back the plate K. The distance that the plate K moves backward depends upon the length of the pin a^{10}.

In order to prevent the plate K from moving backward a greater distance than it would be positively pushed by the slide N, I pivot to the bar P the levers *n'*. There are as many of these levers as there are slides N, and each lies just above its corresponding slide. On the rear end of each lever is an upwardly-turned finger n^2. On the slide is a hump n^3, which, as the slide N is moved backward, engages beneath the lever *n'* and swings it upward, so that the finger n^2 passes behind the rear edge of the plate K; and as the plate is pushed back by the continued backward movement of the slide it strikes said finger when it reaches the end of its intended backward movement and is stopped. This prevents the plate K from being carried back by its own momentum past the point to which it is positively pushed. Of course the distance between the pivots of the levers *n'* and the fingers n^2 will vary in accordance with the variations in the lengths of the pins a^{10}.

I will now trace the movement of the described parts from the key-lever B to the carriage F. As the front end of the key-lever is depressed the bell-crank lever C is rocked. This moves the slide a^8 backward,

and this movement pushes back the case a, which is secured to the rear end of the slide. The pin a^{10} on the case passes through the hole o in the plate O and pushes against the slide N. This slide moves the plate K backward and at the same time lifts the lever n'. When the plate reaches the intended limit of its backward movement, it strikes the finger n^2 and is stopped. The backward movement of the plate draws back the link h^2 because the pin k^4 is in the slot h^4, and this rocks the pawl-carrying frame backward. The slide M is then drawn forward by the action of the cam l on the rod m'. The first effect of this movement of slide M is to cause the bevel m^4 on the stud m^3 to lift the link h^2 and thereby free it from the engagement with the pin k^4. Then the projection m^5 engages in the recess h^5 and pushes the pawl-carrying frame H back till the screw h^5 strikes the block d^3. The ratchet E is turned and consequently the feed-screw is turned an amount dependent upon the distance which the pawl-carrying frame had previously moved backward.

R represents a rock-shaft, having arms r secured near its ends. These arms are connected by links r' to the plate K. Near the middle of the rock-shaft is an arm r^2. A rod r^3 passes loosely through this arm and extends forward to a position where the cam l' on the driven shaft L may engage with it and draw it forward. A head r^4 on the rod r^3 engages with the arm r^2, and as the rod is drawn forward the rock-shaft is rocked and the plate K is by reason of the described connections drawn forward until it is stopped by the slides N coming in contact with the plate O. As the slide N is moved forward by the plate the hump on the slide is withdrawn from beneath the lever n', whereupon said lever falls by gravity until it rests on the bar n^6.

This completes the description of the mechanism which takes part in the step-by-step feed movement of the carriage. In order to retract the carriage, it is necessary to disconnect the ratchet E from the shaft of the feed-screw, so that the screw may be revolved backward. As before stated, the sleeve e is secured to the shaft of the feed-screw by clutch mechanism. A description of the clutch mechanism employed is as follows, viz: On the end of the sleeve e is a disk e', having a notched edge. Secured to the shaft are the two disks e^2 e^3, through which slides a rod e^4, adapted to be projected endwise into any of said notches. The rod e^4 is secured to a sliding sleeve e^5, and the sleeve is moved by a sliding bar e^6, which has a notch e^7, which straddles the edge of the annular flange e^8 on said sleeve. The bar e^6 is moved by a bell-crank lever t, which is connected with a hand-lever T by a link t', the hand-lever being pivoted to the side of the machine.

Having described my invention, I claim—

1. In a machine of the character specified, the combination of a movable carriage, and a feed-screw, with a series of finger-keys, intermediate mechanism whereby a feed movement is imparted to the screw by each of said finger-keys, a series of movable stops n^2 adapted to limit said feed movement, and mechanism for moving said stops severally into operative positions, substantially as and for the purpose specified.

2. In a machine of the character specified, the combination of a movable carriage, a feed-screw, and a ratchet secured to said screw, with a swinging pawl-carrying frame pivoted axially with respect to said ratchet, a pawl carried by said frame, a reciprocating plate K, mechanism for actuating the same, a link secured to said pawl-carrying frame, a separable connection between said link and plate, and a slide adapted to separate said link and plate and to push the link forward, substantially as and for the purpose specified.

3. In a machine of the character specified, the combination of a movable carriage, a feed-screw, a ratchet secured thereto, a reciprocating sliding plate, suitable mechanism intermediate of said plate and ratchet, a slide N engaging with the front edge of said plate, the stop-lever n adapted to be moved by said slide to bring the stop thereon behind the rear edge of said plate, and mechanism for moving said slide, substantially as and for the purpose specified.

4. In a machine of the character specified, the combination of the sliding plate K, the slide N having the shoulder n and the hump n^3 with the lever lying above said plate and having a finger at its rear end, substantially as and for the purpose specified.

5. In a machine of the character specified, the combination of a movable carriage, a feed-screw, a ratchet secured thereto, a pawl-carrying frame, a pawl carried thereby, a sliding plate, mechanism connecting said plate and pawl-carrying frame, mechanism for actuating said plate, and a series of stops adapted to be moved behind said plate, substantially as and for the purpose specified.

6. In a machine of the character specified, the combination of a movable carriage, a feed-screw, a ratchet loosely mounted on the shaft of said screw, a notched disk secured to said ratchet, disks secured to said feed-screw shaft, a bar slidable through said disks and adapted to engage the notches of said disk, a sliding sleeve to which said bar is secured, and mechanism for sliding said sleeve, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES SEARS.

Witnesses:
E. L. THURSTON,
L. F. GRISWOLD.