

UNITED STATES PATENT OFFICE.

CHARLES SEARS, OF CLEVELAND, OHIO.

TYPE-WRITING-MACHINE FEEDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 585,235, dated June 29, 1897.

Application filed January 14, 1896. Serial No. 575,536. (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 Feeding Mechanism for Type-Writers and Analogous Machines; 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.

My invention relates to differential feeding mechanism for type-writers, matrix-making machines, and other analogous machines.

The object of the invention is to provide simple and effective feeding mechanism which, whenever any key is depressed, shall cause the advance of the carriage a distance proportionate to the width of the corresponding character.

The invention consists in the construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a side view of that form of my improved mechanism which is adapted to control the movement of a carriage-feeding screw, the parts being in their normal position. Fig. 2 is a side view of the same parts when they have been moved to a position to measure off a certain feed movement. Fig. 3 is a plan view of the same parts when the mechanism for transmitting motion from the ratchet to the feed-screw is shown only by dotted lines. Fig. 4 is a plan view of said transmitting mechanism. Fig. 5 is a rear view of the invention adapted for use in a writing-machine in which the movement of the carriage is controlled by a straight longitudinally-movable ratchet, the Remington machine being an example of the class. Fig. 6 is a plan view thereof. Fig. 7 is a side view thereof. Fig. 8 is a perspective detail of the cam stop-block, which serves a purpose in returning the pawls to their normal position.

The manner of constructing and mounting a suitable carriage and of connecting it either with a feed-screw or with a longitudinally-movable ratchet is well known, and consequently it has not been thought necessary to show any carriage in the drawings.

To understand the operation of the invention as illustrated in the drawings, it must be assumed that the feed-screw in one case and

the straight ratchet in the other case are subject to the continuous action of a force tending to move them in the feeding direction. The arrows on the ratchets of the two forms of the invention indicate the direction in which said parts are constantly impelled to move and do move when released by the retaining devices.

It is one of the common constructions in machines of this character to apply a tension in this manner to the carriage or to the mechanism for moving it, wherefore it is not thought necessary to show any specific mechanism for this purpose. The part in Fig. 4 indicated by N may represent a spring-barrel containing a spring for this purpose. The tension is usually applied directly to the carriage in the class of type-writers shown in Figs. 5 to 7.

Referring to the parts by letters, A represents a ratchet (shown in Figs. 1 to 4) which is circular in form. A modified form of the ratchet is shown in Figs. 5 to 7. As shown in these figures, the ratchet is straight and is indicated by A'. On the same shaft is a pinion a', which is rigidly connected with the ratchet. The feed-screw B, which is suitably mounted, carries a pinion b, which meshes with the pinion a', whereby any movement of the ratchet A results in a simultaneous and proportionate movement of the feed-screw.

The straight ratchet A' may be rigidly connected with the carriage, which is a common construction.

The movement of either the ratchet A or A' is normally prevented by a retaining-pawl C, which is pivoted to a fixed support.

D represents a movable selecting-plate having a movement which is the same in kind as the movement of the ratchet—that is to say, in that embodiment of the invention employing a ratchet-wheel the plate is pivoted on the same center as said wheel, but is adapted to move independently. In the construction shown in Figs. 1 to 3 the selecting-plate is loosely mounted on shaft a. In the embodiment of the invention containing the straight longitudinally-movable ratchet the selecting-plate, which is indicated by D', is supported in fixed brackets d, in which it may move longitudinally in a path parallel to said ratchet.

A selecting-pawl E is pivoted to the plate D, as shown in Figs. 1 to 4, and to plate D',

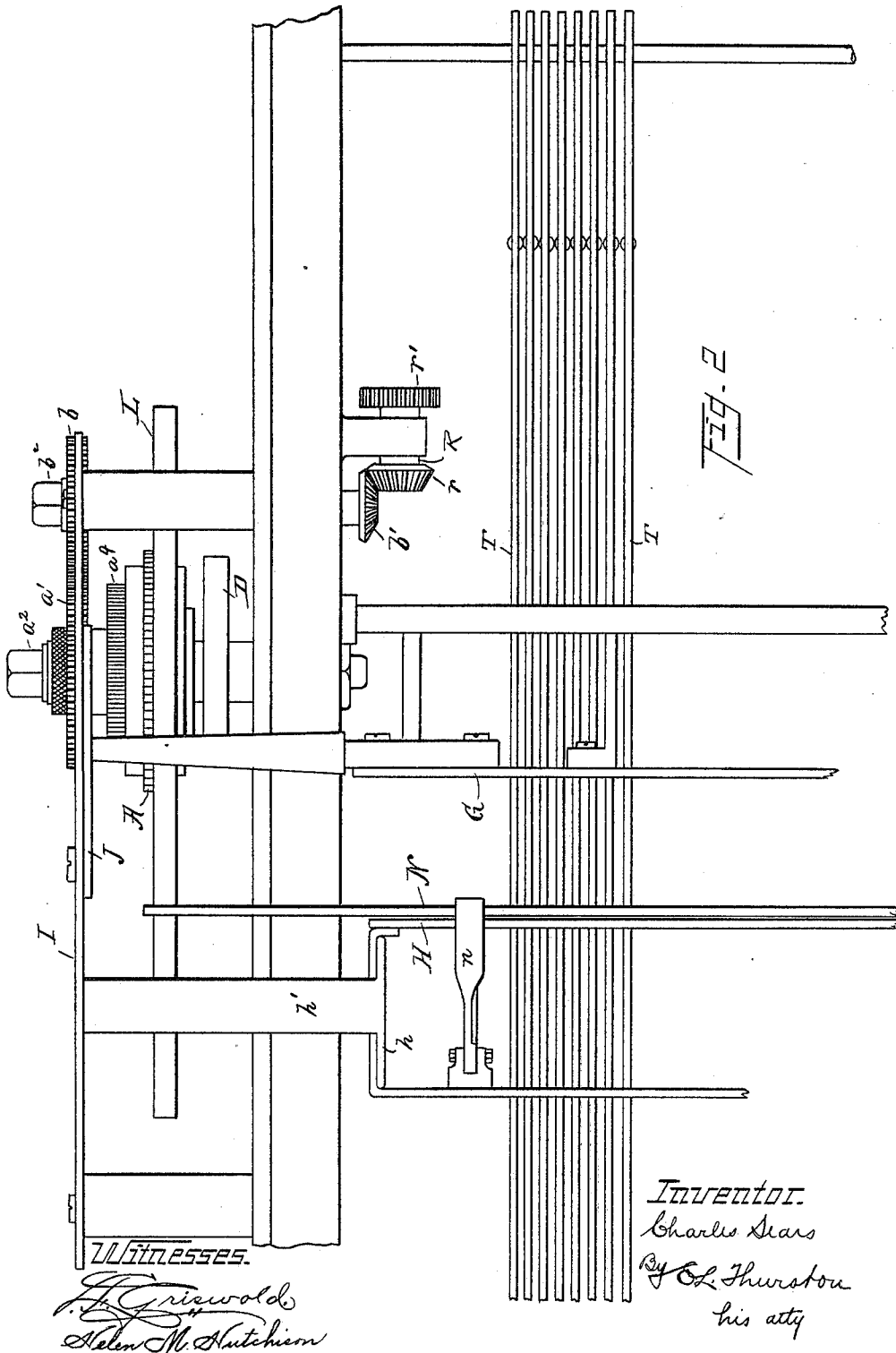
(No Model.)

4 Sheets—Sheet 2.

C. SEARS.
TYPE WRITING MACHINE.

No. 585,236.

Patented June 29, 1897.



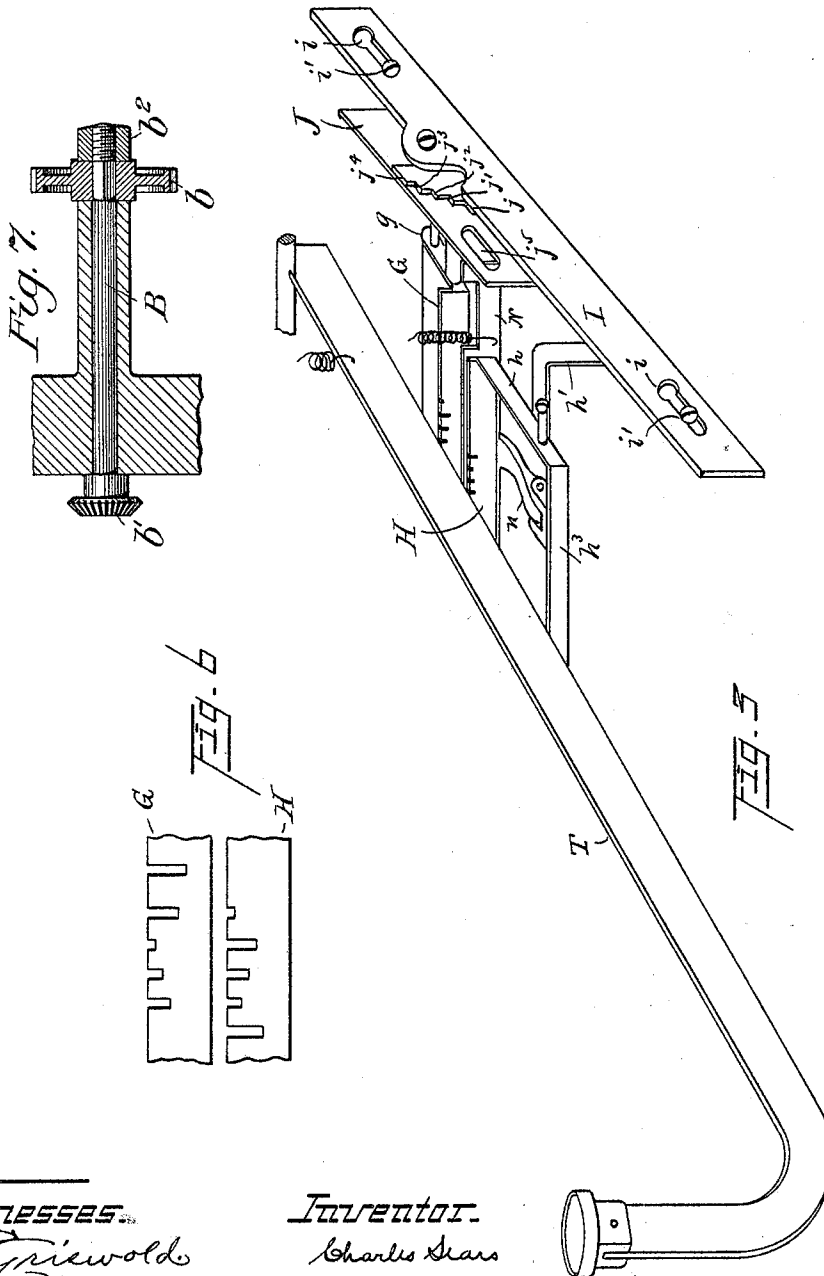
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4 Sheets—Sheet 3.

C. SEARS.
TYPE WRITING MACHINE.

No. 585,236.

Patented June 29, 1897.



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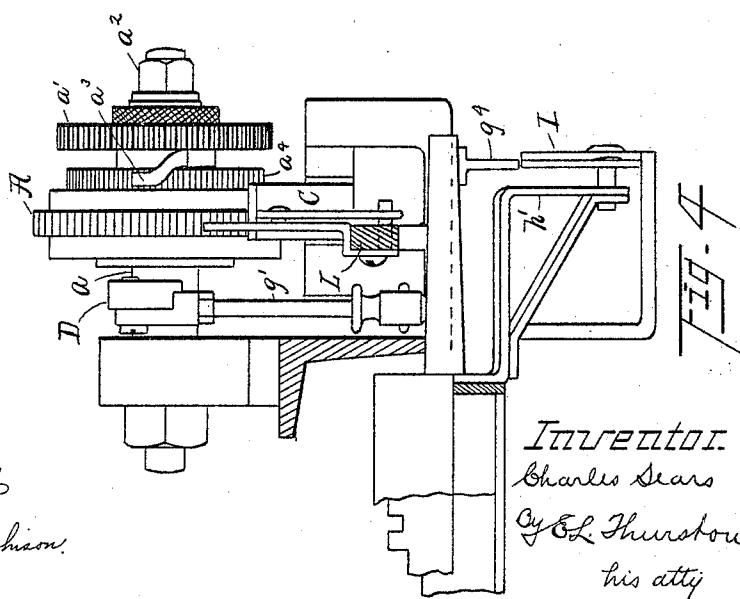
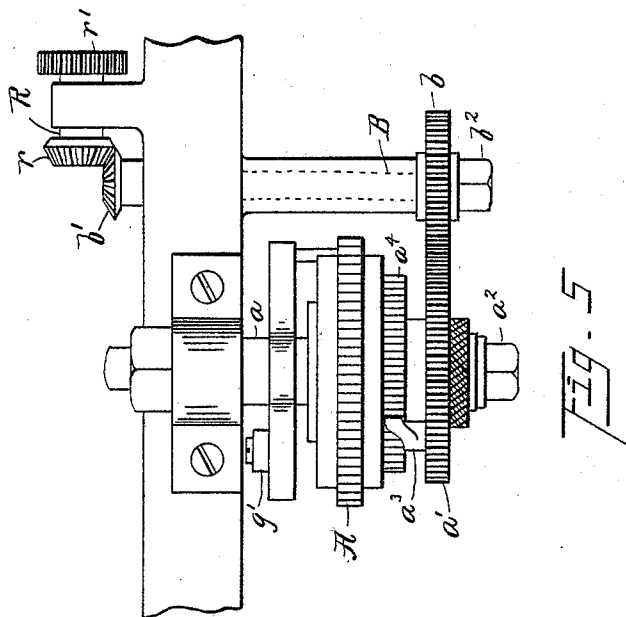
(No Model.)

4 Sheets—Sheet 4.

C. SEARS.
TYPE WRITING MACHINE.

No. 585,236.

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UNITED STATES PATENT OFFICE.

CHARLES SEARS, OF CLEVELAND, OHIO.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,236, dated June 29, 1897.

Application filed May 4, 1896. Serial No. 590,086. (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; 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 hereinafter described is designed especially as an improvement upon the carriage-feeding mechanism for typewriters and analogous machines which is described in my pending application, Serial No. 575,536. The mechanism described in said prior application is completely operative and is thoroughly practical, provided the key-levers are not moved too rapidly and with too much force; but when they are depressed with a strong quick blow they sometimes cause the notched universal bar to acquire a momentum which carries it beyond the point to which it is intended to be positively moved by the key-levers. A very slight movement of said bar in excess of that intended causes the selecting-pawl to be moved past more of the ratchet-teeth than it should, and this results in an excessive feed movement of the ratchet and consequently of the carriage.

The principal object of the present invention is to prevent, under any circumstances, any excessive feed movement of the carriage.

The mechanism shown in the drawings, and hereinafter described, in which my invention is embodied, is adapted to cause the carriage to be fed along each time a key is depressed a distance proportionate to the width of the corresponding character and no greater distance.

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

In the drawings, Figure 1 is a side elevation of the parts of a type-writer or other analogous machine which constitutes my invention. Fig. 2 is a bottom view of the same parts. Fig. 3 is a perspective view of some of the parts of the device. Fig. 4 is a sectional view on line 4 4 of Fig. 1. Fig. 5 is a

plan view of some of said parts. Fig. 6 is a front view of parts of the two bars G and H, showing depth of corresponding notches; and Fig. 7 is a longitudinal sectional view of the bearing for the shaft B, this figure being intended to show the manner in which the gear b is secured upon the said shaft.

Referring to the parts by letters, A represents a ratchet. As shown, it is a ratchet-wheel and it is mounted on a short shaft a, which is fixed to some suitable part of the framework of the machine. The particular form of the ratchet, however, is not an essential feature of the invention.

It has not been thought necessary to show the carriage, because it constitutes no part of the invention and any suitable carriage may be employed. It must, however, be understood that either the carriage or the ratchet or some of the intermediate mechanism is subject to the continuous influence of the force tending to move said parts in the feeding direction. This is, however, no part of the invention and is not shown in the drawings. It is an old construction, which has been heretofore embodied in numerous specific forms and is well understood in the art.

Any suitable intermediate mechanism may be employed for connecting the ratchet and carriage, whereby the movement of the one to which the power above referred to is directly applied will be transmitted to the other; but I have shown certain intermediate mechanism, including one novel feature of construction of great practical value and capable of being made part of whatever intermediate mechanism may be employed, whereby the actual feed movements of the carriage may be increased or diminished to make them conform to different kinds of type without changing the relative movements of the carriage which accompanies the printing of the different letters. A pinion a' is loosely mounted upon the same shaft a and held thereon by a removable nut a², which permits it to be easily removed and another pinion of a different size substituted. This pinion carries a pawl a³, which engages a ratchet a⁴, which is rigidly connected with the ratchet A. This construction compels the ratchet A to move simultaneously with the pinion a' when the same is moved in the feeding direc-

tion, but permits the independent movement of said pinion a' in the reverse direction when the carriage is being retracted. Because I employ the particular ratchet a' and pawl a^3 , as shown, to make the connection between the pinion a' and ratchet A, it is necessary that the power to move the parts in the feeding direction shall not be applied to ratchet A, but to some other part of the described mechanism, preferably the carriage. This pinion a' meshes with a pinion b , which is fastened on a short shaft B, and this shaft is mounted in suitable bearings. The pinion b is provided with an angular hole which fits on the correspondingly-shaped end of said shaft, where it is held by a nut b^2 .

The chief advantage of arranging the pinions a and b so that they may be easily removed is the following: To impart to the carriage a feed movement corresponding to the width of brier type, two pinions a' and b of determined relative size are employed. Now to adapt the mechanism to produce a feed movement corresponding with nonpareil type or any different size of type, these two pinions may be quickly removed and be superseded by other pinions of different relative size. A bevel-gear b' attached to the inner end of this shaft B meshes with a bevel-gear r , attached to a shaft R, mounted in suitable bearings. A pinion r' is secured to the shaft R and it is provided for the purpose of engaging with a rack upon the carriage. This particular mechanism, while useful for the purpose stated, is not essential to an embodiment of the principle, and it may be superseded by any other form of connecting mechanism which is adapted to transmit the motion as above set forth. The movement of the ratchet A is normally prevented by a retaining-pawl C, which is pivoted to a fixed support. This pawl is provided with an extension c on the opposite side of the pivot to that on which is the pawl-tooth. The selecting-pawl E is pivoted to a selecting-plate D, which is capable of moving in a path which corresponds with that of the ratchet. In the present case the selecting-pawl is hung loosely upon the same shaft a upon which the ratchet A is mounted. The selecting-pawl and retaining-pawl are connected by means of a pin e on the selecting-pawl, which projects through a slot c' in the extension of the retaining-pawl above mentioned. Any other form of mechanism may be used for connecting these two pawls which will permit the selecting-pawl to move with the selecting-plate and which will cause one of the pawls to move toward or from the ratchet when the other pawl moves in the opposite direction. The particular construction and connection of these pawls and selecting-plate, which is shown in the drawings, is substantially the same as that which is shown and described in the prior application referred to.

G represents a variably-movable universal bar which extends beneath all of the key-le-

vers T. It constitutes one member of a frame, the sides $g g$ of which are pivoted to the fixed sides of the machine. The variable movement of the bar in the construction shown is due to the fact that it is notched in its top edge directly beneath the key-levers, and the depth of the notch is inversely proportionate to the width of the characters which correspond with the key-levers beneath which said notches are placed. A variably-movable universal bar operated by the key-levers is not of itself new with me; and in prior constructions the variable movement of such a bar is effected in different ways which are the recognized equivalents of each other. For example, the key-levers are sometimes provided with stubs of different lengths for engagement with said bar. Sometimes the bar is equipped with such stubs and sometimes the key-levers have the notches. Any construction which produces the described variable movement of said bar or of the other notched bar H is intended to be embraced within the terms of my claims as the equivalents of such notched bars. A link g' connects the bar G with a part of the selecting-plate D, which lies on the opposite side of the pivot to that to which the selecting-pawl is pivoted. A spring or springs g^2 hold the notched bar up to its normal position relative to the levers and return it to said position after it has been moved down.

H represents a second universal notched bar which lies beneath all of the key-levers. The depth of the notches in this bar is directly proportionate to the width of the characters corresponding with the key-levers beneath which they lie. It is clear, therefore, that the corresponding notches in the said two universal bars are complementary to each other—that is to say, the deeper the notches in one bar the shallower they are in the other. This bar H is a part of a rectangular frame the sides h of which are pivoted to the frame of the machine.

I represents a slide having slots i , through which pass the pins or screws i' , by which said slide is supported and guided. A lever-arm h' is rigidly connected with the frame of which the notched bar H is a part. One pin on the slide enters a slot in this arm, whereby the movement of the notched bar causes a corresponding longitudinal movement of the slide. Pivoted to the slide is a plate J, upon which are secured several stops $j j' j^2 j^3 j^4$, placed progressively at various elevations. A toe g^4 , which is secured to the notched bar G, will when said bar is depressed engage with one or the other of said stops and thus prevent the momentum of the notched bar G from carrying it an excessive distance. These stops are arranged so that the lowest stop, j , which permits the greatest movement of said bar G, is the one which is brought beneath said toe by the shortest movement of the slide I. A greater movement of the slide brings the next stop, j' , beneath said toe, thereby

shortening the possible movement of the notched bar G, and so on until the longest movement which is imparted to the slide J will bring the highest stop, j^4 , beneath the toe g^4 . There are as many of these stops as there are different widths of characters or kinds of feed movement desired. Ordinarily it will be found preferable to use about five of these stops, that being the number shown in the drawings, but a greater or less number can be used, if desired.

L represents a lever pivoted to a fixed pivot. Its forward end is beveled from both top and bottom to a point, and this end engages with a similarly-beveled block m , which is attached to a spring M. This spring exerts a continuous force in the direction of the lever, wherefore the engagement of the beveled surfaces tends to move the lever the full extent of its movement in either direction, after the point of the lever has passed the point on the block m , and to make the accidental movement of said lever impossible. A link m' connects this lever with the plate J. In the plate J is a slot j^5 , into which a pin on the link enters. The link is prevented from swinging by means of a fixed pin m^2 , which enters a substantially vertical slot in the link.

The construction last described permits the plate J to move forward and backward without interfering with the operative connection between it and the said link. A universal bar N also lies beneath all of the key-levers close to the notched bar H and under the lever L. Arms n , which carry the bar N, are pivoted to the forward transverse bar h^3 , which forms a part of the rectangular frame of which the notched bar H is a part, the pivots being preferably in line with the pivots of said rectangular frame. The upper edge of this bar lies normally above the top edge of the notched bar and in contact with the key-levers, and a spring or springs exert a continuous force upon the bar N, tending to draw it up to its highest and normal position. The arms n pass beneath the notched bar H and normally are in contact with the lower edge of said bar H.

The operation of the described mechanism is as follows: When any key-lever is depressed, it first moves the bar N down out of contact with the lever L. Then both bars H and G are moved. When the bar H moves, it causes, as before explained, the forward movement of the slide I such a distance as will bring the proper one of the stops j^4 beneath the toe g^4 , attached to the bar G. The movement of the bar G moves the selecting-plate B and likewise the selecting-pawl, the movement of the said bar G bringing the toe g^4 against the proper stops j^4 with a force sufficient to swing the plate J downward on its pivot. This movement of the plate J through a link m' draws the lever L down, and this movement of said lever through the link c^2 withdraws the retaining-pawl from engagement with the ratchet and consequently

throws the selecting-pawl into engagement therewith, whereupon the feed movement of the ratchet immediately follows. When the key-lever is released, the spring n' lifts the bar N and notched bar H. A spring i^3 draws the slide to its normal position, thereby moving the lever L upward, and this movement of the lever L returns the plate J to its original position and at the same time withdraws the selecting-pawl and causes the retaining-pawl to move into engagement with the ratchet. The spring g^2 returns the notched bar G to its normal position.

It will be understood from the foregoing description of the construction and operation of the device shown in the drawings that the engagement of the notched bar G through its toe g^4 with the proper stop prevents any excessive movement of said bar G, while the notched bar H and connecting mechanism provide the means for always moving the proper stop beneath said toe.

Having described my invention, I claim—

1. In carriage-feeding mechanism for typewriters and analogous machines, the combination of a plurality of levers, and a single bar extended across said levers and adapted to be moved various distances by different levers, and a series of stops which are adapted to severally engage with said bar, and to act to stop its movement at different points, and mechanism operated by the bar to move the proper one of the several stops into the path of said bar, substantially as and for the purpose specified.

2. In carriage-feeding mechanism for typewriters, the combination of the key-levers, a movable notched bar which lies beneath the key-levers, a slide, a series of stops carried by said slide and adapted to engage with and stop the movement of the notched bar, mechanism operated by the key-levers for moving said slide, a ratchet, a movable selecting-plate, mechanism intermediate of said plate and the notched bar whereby the former is operated by the latter, a selecting-pawl carried by said plate, a retaining-pawl, and mechanism for moving said pawls simultaneously in reverse directions into and out of engagement with the ratchet, substantially as and for the purpose specified.

3. In carriage-feeding mechanism for typewriters, the combination of the key-levers, two universal bars lying beneath the key-levers and having complementary notches in their upper edges, a series of stops adapted to engage with and stop the movement of one of said bars, and mechanism operated by the other bar for moving said stops, substantially as and for the purpose specified.

4. In carriage-feeding mechanism for typewriters, the combination of the key-levers, two movable notched bars G, H, lying beneath said key-levers, a selecting-plate and mechanism for transmitting motion from one bar to said selecting-plate, a slide operated by the other notched bar, a plate J pivoted there-

to, a series of differently-placed stops carried by said plate and adapted to engage with the first-named notched bar, a lever L, a link connecting it with the plate J, a ratchet, two escapement-pawls pivoted one to a fixed support and one to the selecting-plate, and mechanism connecting said lever L and escapement-pawls, whereby said pawls are operated, substantially as and for the purpose specified.

5. In carriage-feeding mechanism for typewriters, the combination of the key-levers, a variably-movable bar H beneath said key-levers, a slide, mechanism connecting said slide and bar, a stop or stops carried by said slide, a second variably-movable bar G beneath the key-levers adapted to engage with said stop or stops, a third movable bar N beneath the

key-levers, a lever L extending across said bar N, escapement mechanism operated by said lever and bar G, and springs for returning said bars to their normal position, substantially as and for the purpose specified.

6. In carriage-feeding mechanism for typewriters, the combination with the feeding-ratchet, and mechanism for moving it differentially, with removable and changeable mechanism for transmitting the movement of the ratchet to the carriage, substantially as and for the purpose specified.

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

CHARLES SEARS.

Witnesses:

THOS. C. HINKLEY,

H. P. SEARS.