

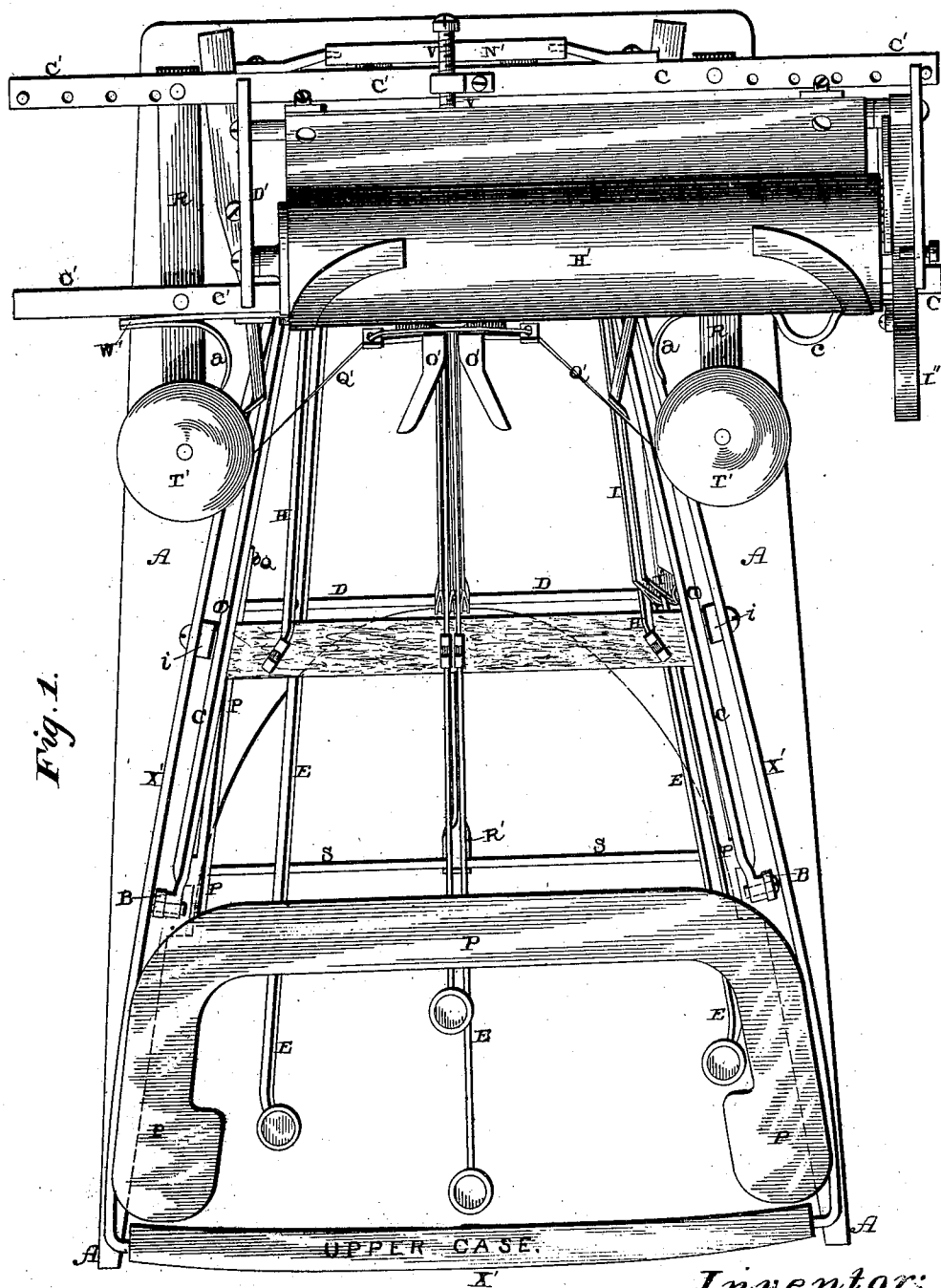
(No Model.)

5 Sheets—Sheet 1.

J. D. DAUGHERTY.
TYPE WRITING MACHINE.

No. 470,990.

Patented Mar. 15, 1892.



Witnesses:

E. P. Ellis,
B. Brocken,

Inventor:

J. D. Daugherty,
per
Lehmann & Patterson,
attys

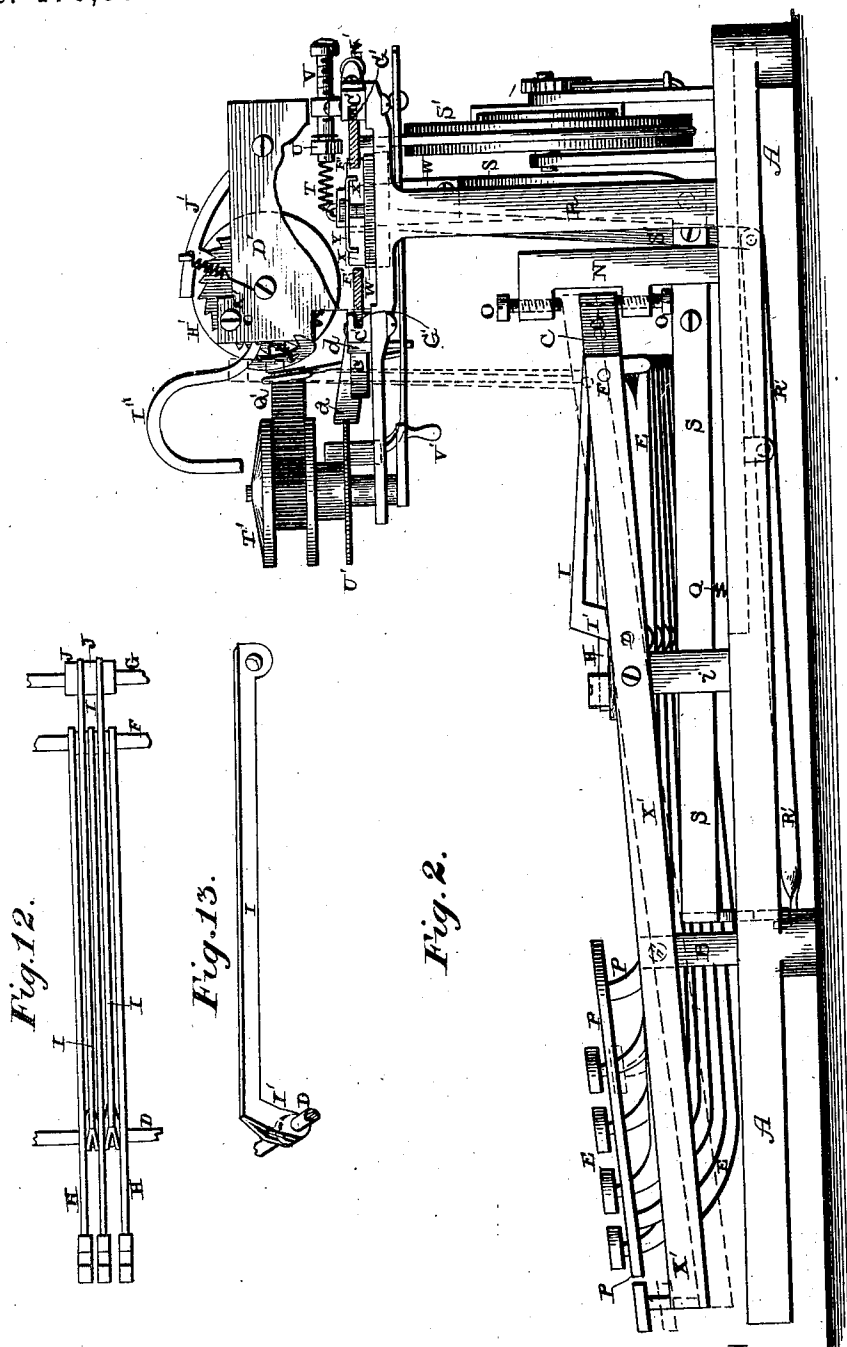
(No Model.)

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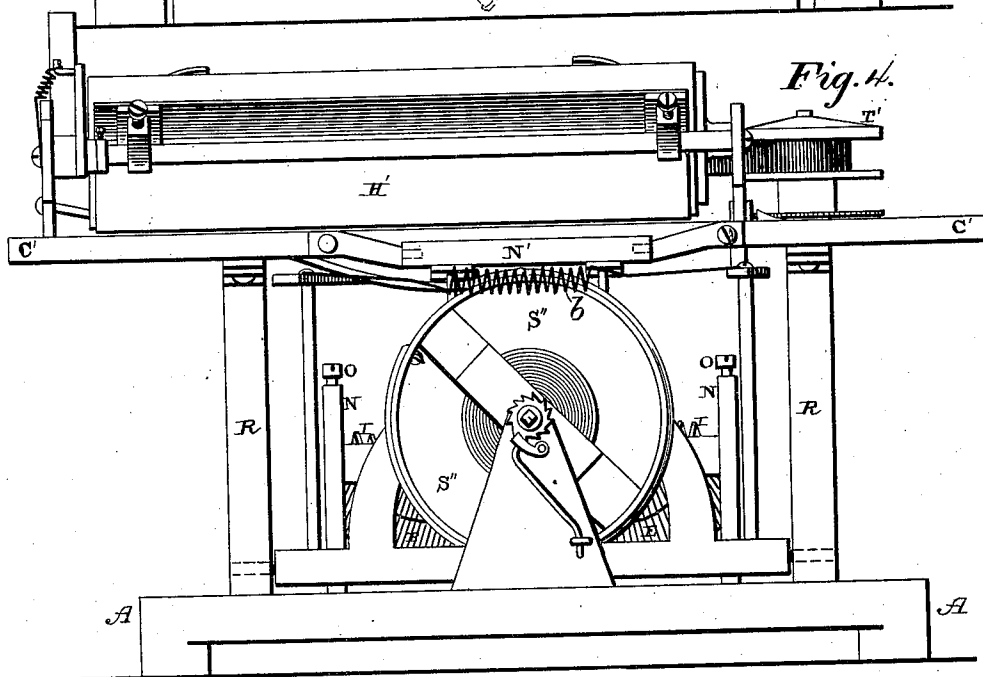
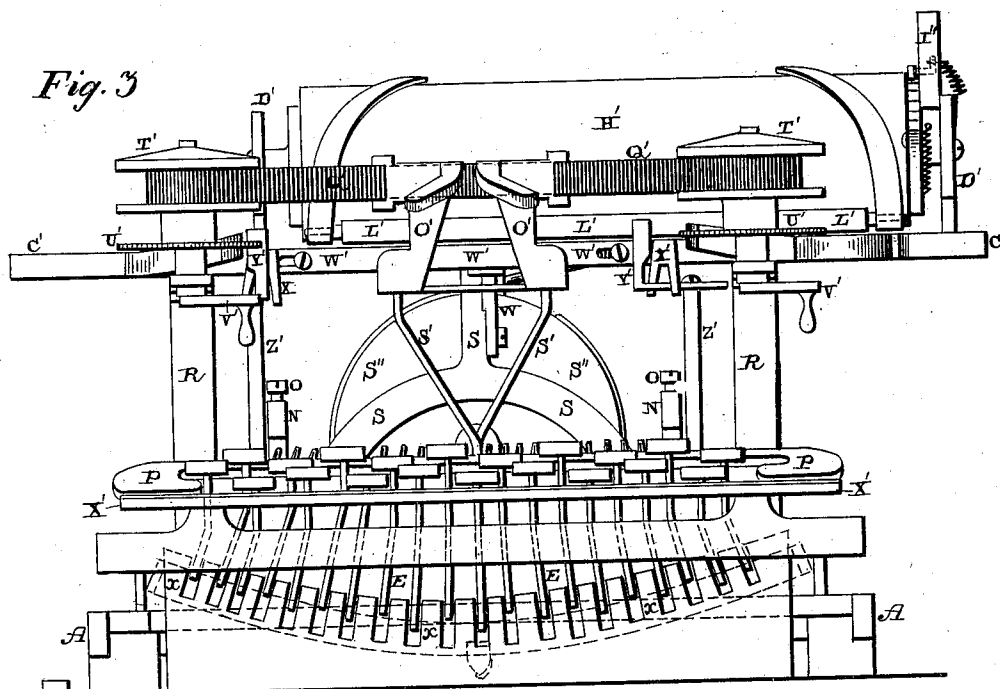
(No Model.)

5 Sheets—Sheet 3.

J. D. DAUGHERTY.
TYPE WRITING MACHINE.

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Patented Mar. 15, 1892.



Witnesses:

E. P. Ellis,
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(No Model.)

5 Sheets—Sheet 4.

J. D. DAUGHERTY.
TYPE WRITING MACHINE.

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Fig. 5.

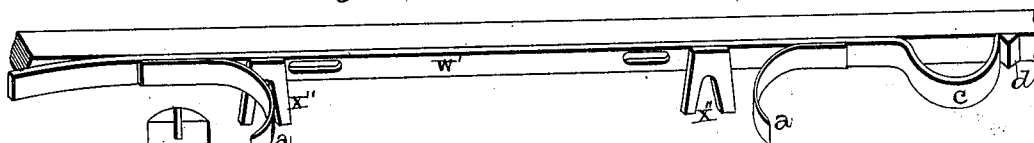


Fig. 6.

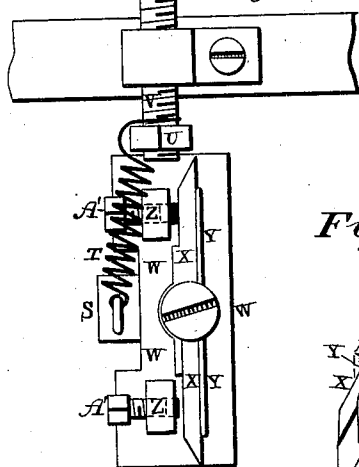


Fig. 9.

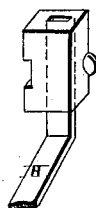


Fig. 7.

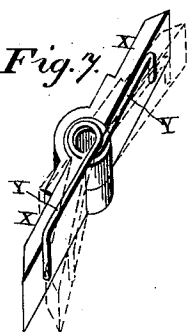


Fig. 8.

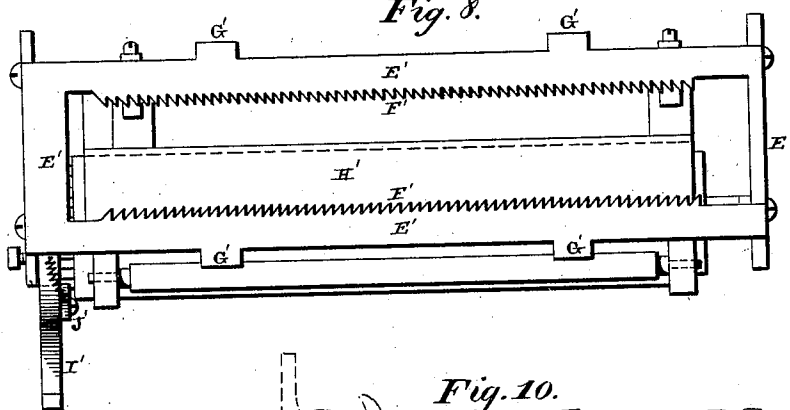
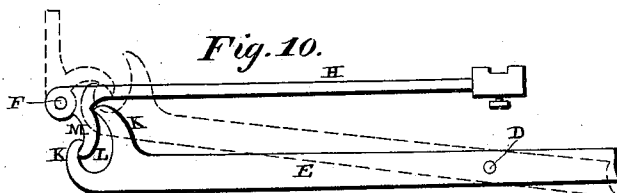


Fig. 10.



Witnesses:

E. P. Ellis

B. Brockett,

Inventor:

J. D. Daugherty,
per
Lehmann & Patterson, attys.

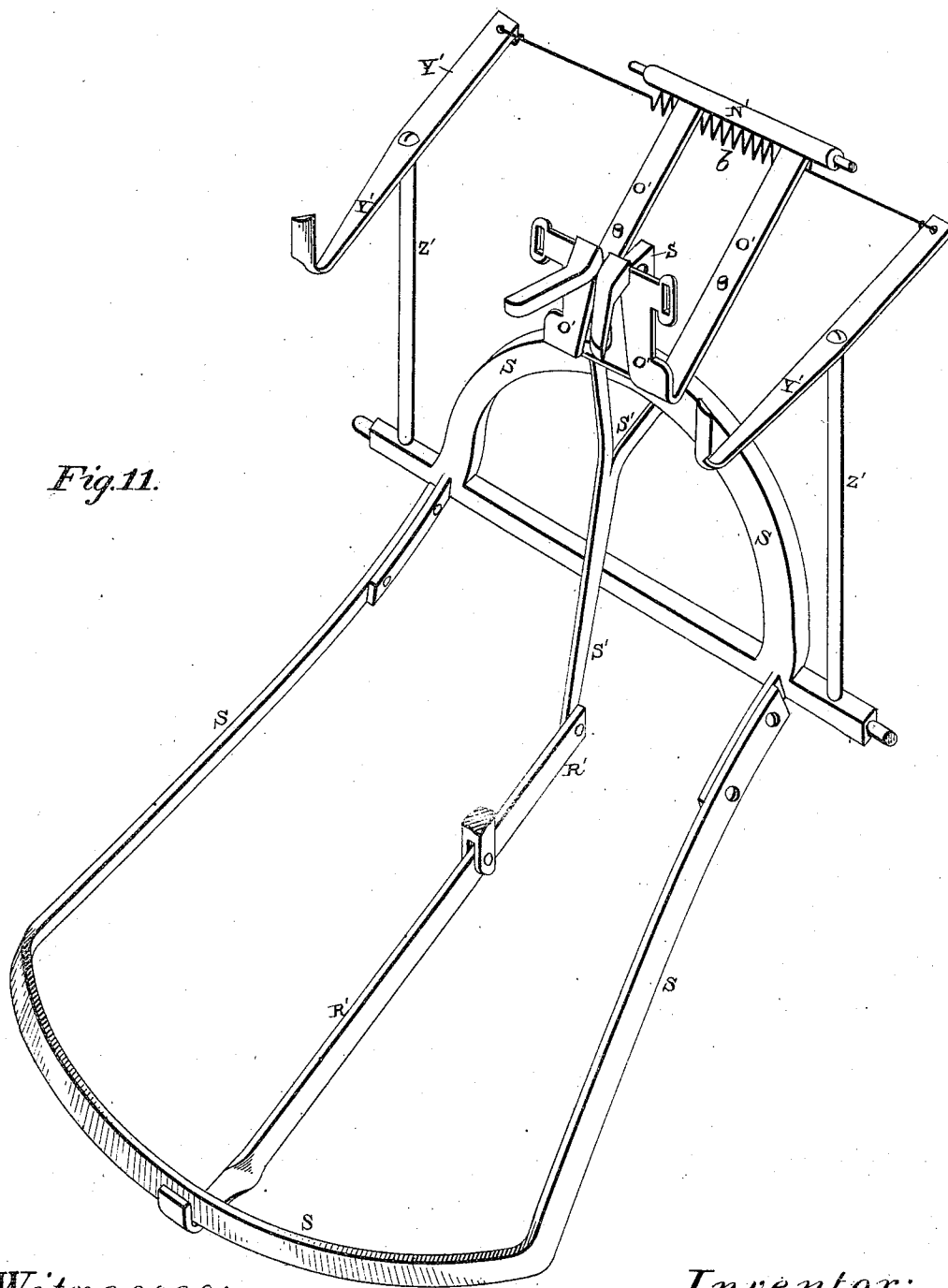
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J. D. DAUGHERTY.
TYPE WRITING MACHINE.

No. 470,990.

Patented Mar. 15, 1892.



Witnesses:
E. P. Ellis,
B. Brockett.

Inventor:
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Attys

UNITED STATES PATENT OFFICE.

JAMES D. DAUGHERTY, OF KITTANNING, PENNSYLVANIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 470,990, dated March 15, 1892.

Application filed May 2, 1890. Serial No. 350,286. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. DAUGHERTY, of Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Type-Writing 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in type-writing machines; and it consists in the arrangement and combination of parts which will be more fully described hereinafter.

The objects of my invention are to connect the key-levers and the type-bars directly at their inner ends without the intervention of any other parts, so as to simplify and cheapen the construction and lessen the friction in the operation of the machine; to separate the type-bars and the key-levers by means of division bars or plates, which prevent the parts from interfering with each other; to provide each type-bar with a type or types having capital and small letters or other characters upon them; and to change from one letter or character to the other by raising the inner end of the frame which carries the type-bars and the key-levers, while the roller or platen carrying the paper remains stationary; to pivot at its rear end the guiding-frame for the type-bars, and which also holds or carries the ribbon, and to give to this guiding-frame a vertical movement at its free front end, so that while it serves as a guide to the type-bars it also raises the ribbon, so that each type-bar prints its character in alignment, and then as the type-bar drops back to its normal position the guiding-frame carrying the ribbon also drops, so as to leave each letter or character, as well as the whole line of writing, unobstructedly exposed to the operator without the movement of any other part; to operate the carriage by means of two pivoted spring-actuated dogs, which allow the carriage to move forward one space each time that one of the type-bars is operated, and which permit the carriage to slide freely back to its starting position.

Figure 1 is a plan view of a type-writer which embodies my invention. Fig. 2 is a side

elevation. Fig. 3 is a front end view of a type-writer to which my invention is applied. Fig. 4 is a rear end view of the same. Figs. 5, 6, 7, 8, 9, 10, 11, 12, and 13 are detail views of the different parts of the same.

A represents the base-plate, which will be of any desired shape, size, or construction that may be preferred, and from which at any suitable point rise the two posts or projections B, to the upper ends of which are pivoted the front ends of the frame C, in which are pivoted upon the rod D the key-levers E. Extending across the rear or inner end of this lifting-frame C are the two curved pivotal rods F G, and pivoted upon the rod F are the type-bars H, and secured to the rod G are the rear ends of the division-plates I, and the front ends of the division-plates are secured to the curved pivotal rod D', upon which the key-levers E are pivoted. These division-plates I are secured rigidly in position and separated at their rear ends by washers J, which are slightly thicker than the type-bars. These division bars or plates I serve to separate the type-bars and key-levers at their rear ends, and also serve to separate and hold the key-levers in position upon the pivotal rod D. These division-plates I are preferably given the shape shown and have a downwardly-extending portion I' at their front ends, which are made to increase from the upper front corner of the bar or plate in thickness down to the top edge of the key-levers, and from this they are all of a uniform thickness. This increased thickness at the lower ends of the extensions I' is made for the purpose of separating the key-levers and holding them rigidly in position upon their pivotal rod D. The upper edges of these division-bars or plates I are of one uniform size or thickness, there being sufficient space between them to allow the type-bars to freely operate and at the same time so confine them as to prevent their interference in operation with each other. The beveled or inclined sides of the extensions I' serve to prevent the type-bars from having any lateral play or movement when they are at their lowest point, while the upper edges of the plates allow the type-bars abundance of room for any amount of movement that may be necessary. These division-plates I may either be formed of pieces of solid metal

or they may be formed of sheet metal, as here shown, and which pieces of sheet metal are bent double and have these double portions separated at their lower ends by means of washers, which are placed upon the rod D. The inner end of each of the key-levers E, which are pivoted on the rod D, is provided with curved arms or projections K, which form an opening or socket L, having curved sides, and each one of the type-bars is provided with a curved arm, lever, or projection M, which catches in the socket L of its corresponding lever E, thus forming an interlocking joint for connecting these parts, and that without the intervention of any other piece or part of any kind whatsoever. When the front end of one of the key-levers is depressed at its rear end, as it moves upward it exerts a pressure upon the arm or projection M of its corresponding type-bar, and thus causes the type-bar to turn upon its pivot through nearly a quarter of a circle and imprint one of its characters upon the paper. As soon as the key-lever is released a spring which is connected to the feed-lever presses the front end of said feed-lever against the under side of all of the key-levers and the spacing-bars, and thus causes the type-bars through their corresponding key-levers to instantly return to their normal position. As will be seen, the type-bars are pivoted upon a curved rod, and when in their normal position they form a segment of a circle. The center bar is made perfectly straight, while those bars upon its sides are slightly curved or bent at their outer ends, the curve or bend at the ends increasing in degree the farther the bars recede from the center and at such an angle as to bring the types upon the bars in a vertical position when at the printing-point. Pivoted between its ends upon the standards i, which project from the frame A, is the shifting or "upper-case" frame X', which has its inner ends pivotally connected to the inner end of the frame C, and this frame X' extends around in front of the keys, as shown in Fig. 1. A downward pressure upon the outer end of the frame X' raises its inner ends and with it the inner end of the frame C, in which the type-bars are pivoted upon the rod F.

Rising from the base-plate A, opposite the inner corners of the lifting-frame X', are the posts N, which have the two inward extensions at their upper ends, and through these extensions are passed the set-screws O, against which the opposite edges of the lifting-frame strike for the purpose of regulating with the utmost nicety the distance that the lifting-frame shall be raised in changing from one type or character to another, and thus every letter and character be brought into perfect alignment. When the lifting-frame is down in its normal position, as shown in Fig. 2, only the smaller letters are brought into operation; but when the inner end of this lifting-frame carrying the type-bars and all of their attachments is raised by depressing the front

end of the lifting-frame then the type-bars will print only the capital letters or the characters which are thus brought into alignment. It will be noticed that the type-bars are given a vertical movement, while the roller or platen carrying the paper to be printed upon remains stationary, thus reversing the usual method employed in the type-bar machines now in the market of changing from one form of letter to the other.

Pivoted upon the curved rod D is a spacing bar or lever P, which extends across in front of the keys and at each side, as shown, so as to be in position to be struck by any finger and from any point, and thus enable it to be operated more rapidly and easily than can be done where the rod or bar extends along in rear of the keys in the usual manner or where the spacing mechanism is operated from a small key. In order to hold the spacing-lever up in position and to return it instantly to position after being operated, there is attached to each of the inner ends of this lever beyond the pivotal bar D a light spring-wire Q, and this wire has enough elasticity to hold up the spacing-lever when the feed-lever has been depressed by one of the key-levers.

Pivoted between the two standards R, which rise from the rear corners of base-plate A, is an L-shaped feed-lever S, which has its front end to extend across the top of the base-plate underneath the keys and spacing-levers, as shown in Fig. 2, so that each time one of these levers is operated the feed-lever S is operated thereby. To the upper end of this feed-lever S is fastened one end of the spring T, by means of which the lever is returned to its normal position as soon as it is left free to move after it has been operated by one of the keys or spacing-levers. The rear end of this spring T is secured to a nut U, placed upon a screw V, which passes through a projection upon the top of one of the grooved sliding bars upon which the carriage moves. By means of the screw and the nut the tension of spring T can be regulated at will, and thus give to the key and the spacing-lever a harder or a softer touch, as may be desired. Mounted upon the upper end of this feed-lever S is the adjustable head W, upon which the two spring-actuated parts of the dog X are pivoted, and this head W is made adjustable upon the upper end of the lever, so that the dog can be adjusted into position to operate directly with the rack-bars. This head W is secured to the lever S by means of screws, the upper one of which passes through a slot in the head, and this slot permits the necessary adjustment for the dog. The dog X is made in two parts, which are jointed at the center of the head, so as to allow each part an independent movement of its own, and both parts of the dog are held in line with each other by means of a spring Y, which is applied thereto. This spring serves to hold the two parts of the dog X pressed back-

ward against each other where they overlap, and thus form, practically, a rigid or single dog; but the spring allows the two parts of the dog to freely give as the carriage is returned to its starting-point, when the beveled side of the end of the dog, which is engaged with the rack, slips freely over the teeth of the rack so engaged. Rising from the top of the head are the two projections Z, through which pass the horizontal set-screws A', which have their inner ends to bear against pieces of rawhide, rubber, or other suitable substance, which is placed in the holes through which the screws pass, and which substance serves to prevent the dog from making any unnecessary amount of noise. The set-screws serve to adjust the rawhide forward, and thus regulate the angle or position that the two parts of the dog shall occupy in order to properly engage with their corresponding racks. As the feed-lever is caused to vibrate by the movement of the keys and spacing-lever, the ends of the dog are made to play in and out upon the teeth of the opposite racks, and thus allow the carriage to move forward one space for each movement of one of the levers. While one end of the dog is forced backward by the pressure of the carriage, the other end is forced one half-space forward, so as to be ready to engage with its corresponding rack when the feed-lever is moved in that direction, and then this end which was forced forward so as to be ready to engage with its rack is in turn forced backward after it engages with the rack, and thus the dog is made to partially turn upon its pivot, and at each partial turn the other end is brought into an operative position. As the inner ends of the two parts of the dog overlap, the two parts are held rigidly together, so as to always be in a line with each other while the carriage is being fed forward; but either of these parts of the dog give freely before the carriage when the carriage is being moved back toward its starting-point.

By means of the construction here shown and described it will be readily seen that the dog consists of only two parts, which are jointed together, a spring for pressing the two parts into line with each other, and the two adjusting set-screws, and that a very cheap feed mechanism is produced. The great advantage of this construction consists in having the carriage to move one half-space as the type-bar rises, and then move the other half-space as the type-bar descends, thus causing the carriage to move while the type-bar is in motion instead of having the carriage move only after the type-bar has returned to its normal position. As a consequence, a much more rapid feed is given to the carriage, and it is impossible to strike any two of the keys so rapidly that the carriage does not move its full space at each stroke. Rising from the inner ends of the base-plate A are the two T-shaped standards or supports R, upon which are mounted the two grooved guiding-bars C', upon which the carriage D' moves,

and which supports also have the ribbon-spools placed upon them. The carriage D' consists of a plate E', which has its ends turned vertically upward, so as to form bearings or supports for the different parts, and which has its central portion cut away, and the two racks F', formed as a part of the plate. Projecting from opposite outer edges of this plate are the extensions or tongues G', which catch in the grooved guiding-bars C', and thus guide the carriage back and forth in its movements. Journaled between the upturned ends of the plate is a roller H', which is provided with a lever I' and a spring-actuated dog J' for revolving the roller and moving the paper. The lever may either be given the shape here shown or any other that may be preferred, and the distance that the roller is made to turn at each movement of the lever can be regulated by means of a stop-pin K', which can be placed in either one or two holes prepared for it. If placed in the upper hole, the lever will move a longer distance and turn the roller a greater distance than it will if the pin is placed in the lower hole. Placed in front of the lower front face of the large roller is the small roller L', which serves to cause the paper to move when the large roller is moved by the lever. The whole frame of the carriage being formed from a single plate, which can be stamped up and have the racks formed as a part thereof, the cost of the construction of the machine is greatly simplified and cheapened.

Pivoted by means of the rod N', which is journaled back of the rear grooved guiding-bar C', is the guiding-frame O', which both holds the ribbon in position and guides the type-levers into position, so as to strike the paper in regular spacing. As will be seen, the front end of this frame is divided and the upper part is formed into two horizontal prongs, which are separated from each other at any suitable angle, leaving just sufficient space between their inner ends to allow the types to strike the paper, and that without any lateral play or movement. These two prongs are given the V shape shown, so as to guide the type-bars at the sides into position with the same precision and accuracy as it does those located at or near the center of the machine. This guiding-frame O' has openings through its front end for the passage of the ribbon Q' and is given a vertical movement at this front end for the purpose of raising the ribbon as each type-bar rises, and thus bring it into position to be struck by the type, and then as the type-bar returns to its normal position the ribbon is depressed, so as to leave a free and unobstructed view of the entire line which is being written. As above stated, this guiding-frame is pivoted at its rear end, and its front end has a rising-and-falling movement for the purpose of operating the ribbon directly in front of the eye, where the operator can see every letter that is made and the connection of each word with what has

preceded or followed it. In order to give the operator an unobstructed view as possible, there are no parts placed between the eye of the operator and the paper, with the exception of the front end of this frame, which always drops below the line of writing as soon as a letter is struck. For the purpose of giving this frame a vertical play at its front end there is pivoted upon the under side of the base-plate a lever R', which extends at its front end underneath the feed-bar or front end of the feed-lever, where it extends across under the key and spacing levers, and which lever R' is connected at its rear end to the vertical lever S', which is forked at its upper end and connected directly to the guiding-frame O'. Each time that one of the key or spacing levers is depressed the front end of the feed-lever and the front end of the lever R' are also depressed, and as the rear end of the lever R' is raised the guiding-frame O' is raised before the type-bar can rise to strike the paper. The carriage is drawn forward by a cord or strap, which is wound around the wheel S'', which has a flat spring wound around its axle or journal, and which journal is provided with a ratchet or dog, whereby the tension of the spring can be increased or decreased at will. The carriage is returned to the starting-point by means of its operating-lever.

The two ribbon-spools T' are mounted upon the extended upper front end of the frame, and each spool is provided with a ratchet U' and a handle V' on the lower end of its shaft or journal. By means of these handles the ribbon can be rapidly wound from one spool to the other, as may be desired. The reversing of the movement of the ribbon is caused by a sliding bar W', which is provided with suitable guiding-slots and secured to the front edge of the front grooved guiding-bar C' by means of set-screws. This sliding bar W' has suitable arms or prongs X' projecting from its lower edge, and these prongs catch upon opposite sides or edges of the dogs Y', which are pivoted upon the standards Z', which rise from and move with the feed-lever, which is pivoted between the two standards upon which the carriage is placed. Also secured to this sliding bar W' are two springs a, which are curved in opposite directions and which alternately engage with the ratchets of the ribbon-spools. These springs secured to the bar and the dogs Y', moved by the arms projecting from the lower edge of the bar, are moved so that while one dog and one spring are engaging with one ratchet the other dog and other spring are moved away from their ratchet, so as not to engage therewith. At each endwise movement of the bar one dog and one spring are brought into operation with their corresponding ratchets, while the other spring and dog are thrown out of operation. By moving the bar W' endwise the ribbon is caused to reel upon either spool that may be desired, and thus its movement is reversed in the usual

manner. The two dogs Y' are pivoted upon the standards Z', so as to have a partial turning movement of their own at the same time that they are given a reciprocating movement each time the feed-bar is moved for the purpose of turning the spool upon which the ribbon is being reeled. In order to hold these two dogs in their proper position, their rear ends are connected by a suitable spring b, which allows them a sufficient play at their front ends to engage and disengage from the ratchets in such a manner as to cause the spools to revolve a suitable distance at each movement of the feed-lever. As soon as the dog begins its backward movement the corresponding spring engages with the ratchet and prevents any backward movement of the spool. It will be seen that the endwise movement of these dogs is produced entirely by the rocking movement of the feed-lever, so as to move the ribbon the moment it has been struck by a type, and thus no two types ever strike successively in the same place upon the ribbon. This construction greatly simplifies and cheapens the cost of the machine, and a mechanism is produced for operating the ribbon which is not likely to ever get out of repair while in operation. The sliding bar W' has one of its ends formed into a curved elastic handle c, and the outer end of the handle moves back and forth over a projection d, which serves to retain the bar in whatever position it may be adjusted. The only object and use of this endwise sliding bar W' are to reverse the movement of the ribbons, and it is so constructed and arranged that the operator has only to apply one finger to the handle formed upon one end, and thus move it in either direction desired. This construction enables the movement of the ribbon to be reversed by a single movement of the bar W' by one of the fingers.

In order to prevent the free ends of the key-levers and the spacing-bars from having any lateral play or movement, a curved vertical toothed plate is placed below the lower edges of these levers, and the upper ends of the teeth extend up between the levers, so as to allow them only a vertical play. By means of this construction the key-levers are prevented from being bent or from getting out of position at any time.

As shown in Fig. 9, the type-blocks are secured to the ends of their respective type-bars, having a hole or opening made through each one of the blocks to receive the end of the bar, and then the block is fastened into any desired position by means a set-screw. This construction enables the type-blocks to be adjusted with the utmost accuracy with very little trouble.

Having thus described my invention, I claim—

1. In a type-writer, the combination, with a carriage, of a vertically-shifting frame carrying key-levers and type-bars, the latter having each two or more characters, whereby

when the frame is shifted the type bars and keys are moved therewith, substantially as shown.

2. In a type-writer, the combination, with a
5 frame and a carriage supported horizontally thereon in an elevated position, of a horizontal frame pivoted between its ends below the said carriage and a series of type-bars pivoted in the inner end of the said frame, having each
10 two letters, whereby the tilting of the frame will move the type-bars vertically and bring either letter in position to print, substantially as shown.

3. The combination of the frame C, provided with the cross-bars D F G and the key-
15 levers pivoted upon the cross-bar D, with the type-bars and the division-plates, substantially as shown.

4. The division-plates I, provided with the
20 downward extensions I' at their front ends, the extensions being widest or thickest at their lower ends, substantially as described.

5. The combination of the frame C, provided with cross-bars D F G, the division-
25 plates secured to the bars D G and separated by washers, and the type-bars, the plates being provided with downward extensions upon

their front ends and which extensions are made thickest at their lower ends, substantially as set forth.

6. The combination of the pivoted lifting-
30 frame carrying the key-levers and the type-bars with the standards N, provided with regulating devices for limiting the movement of the rear end of the frame, and a means for
35 lifting the said frame, substantially as described.

7. In a type-writer, the combination, with the carriage supported in an elevated position, of a frame pivoted below the carriage
40 between its ends, the type-bars pivoted in the inner end of the frame and each having two characters; and means for tilting the frame, whereby the tilting of the frame brings either
45 in position for printing, and adjustable stops above and below the frame, which engage therewith for limiting its movement, substantially as specified.

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

JAMES D. DAUGHERTY.

Witnesses:

F. A. LEHMANN,
E. P. ELLIS.