No. 662,147. Patented Nov. 20, 1900.

C. GABRIELSON.

TYPE WRITING MACHINE.

(Application filed Dec. 26, 1899.)

(No Model.) 4 Sheets—Sheet 1.

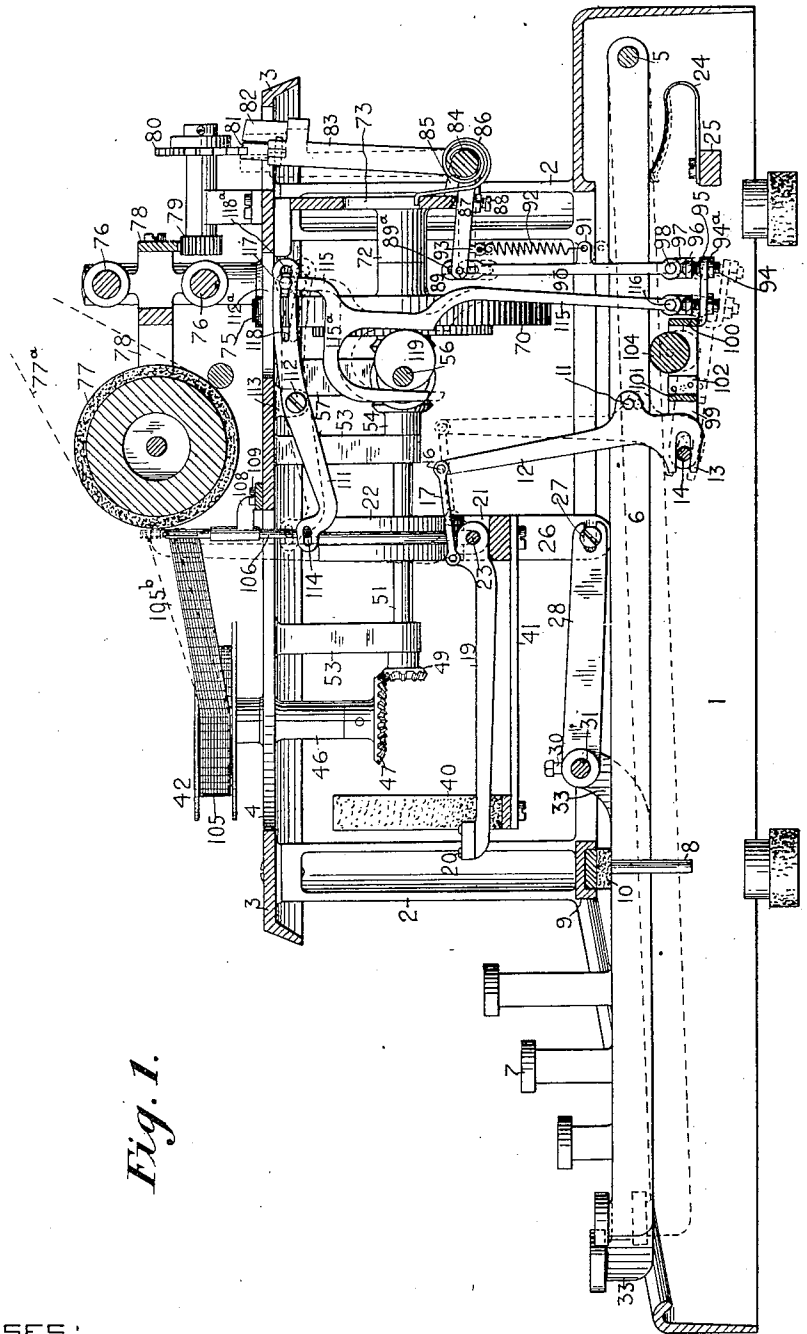

Fig. 1.

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(Application filed Dec. 26, 1899.)

(No Model.) 4 Sheets—Sheet 2.

Fig. 2.

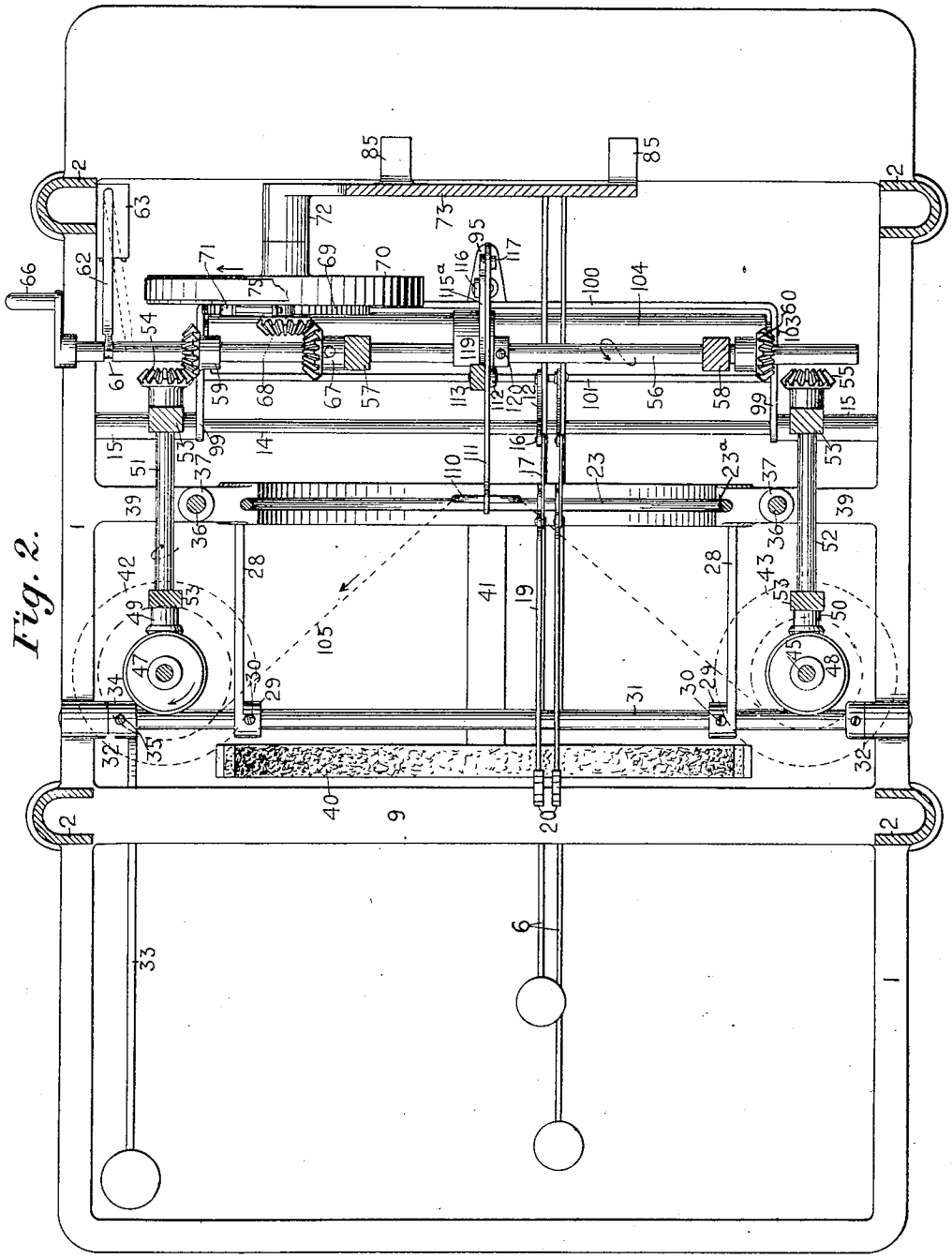

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Fig. 5.

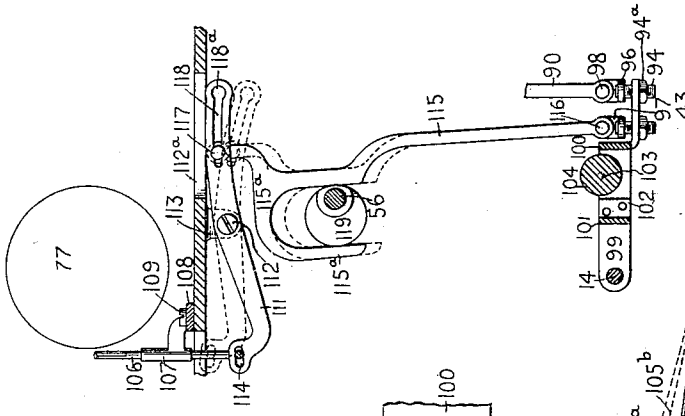


Fig. 4.

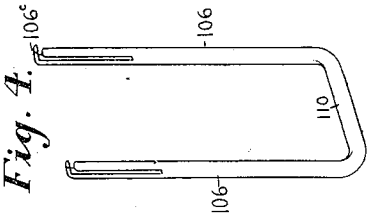


Fig. 6.

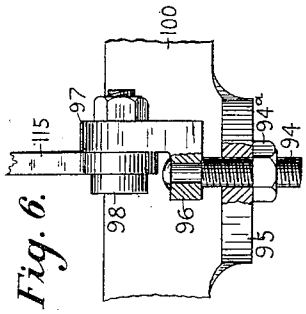


Fig. 7.

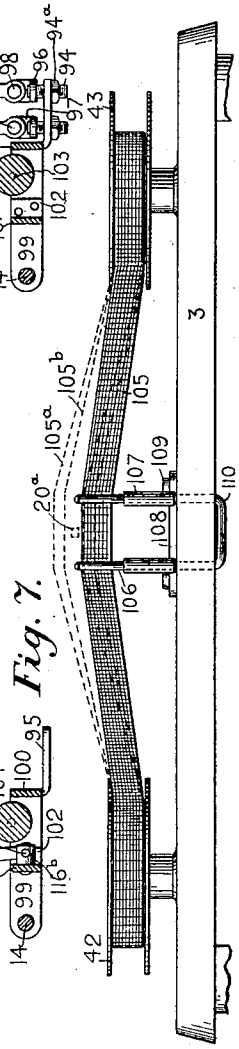
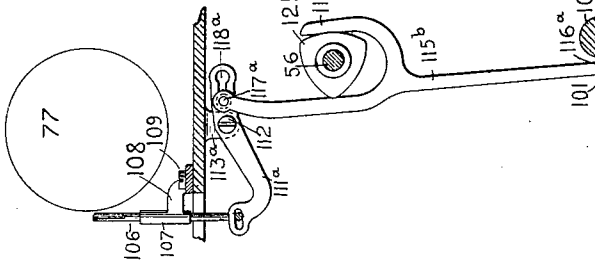


Fig. 3.



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TYPE WRITING MACHINE.

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(No Model.) 4 Sheets—Sheet 4.

Fig. 10.

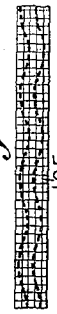


Fig. 9.

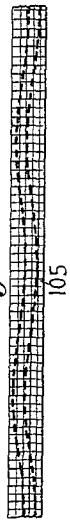


Fig. 11.

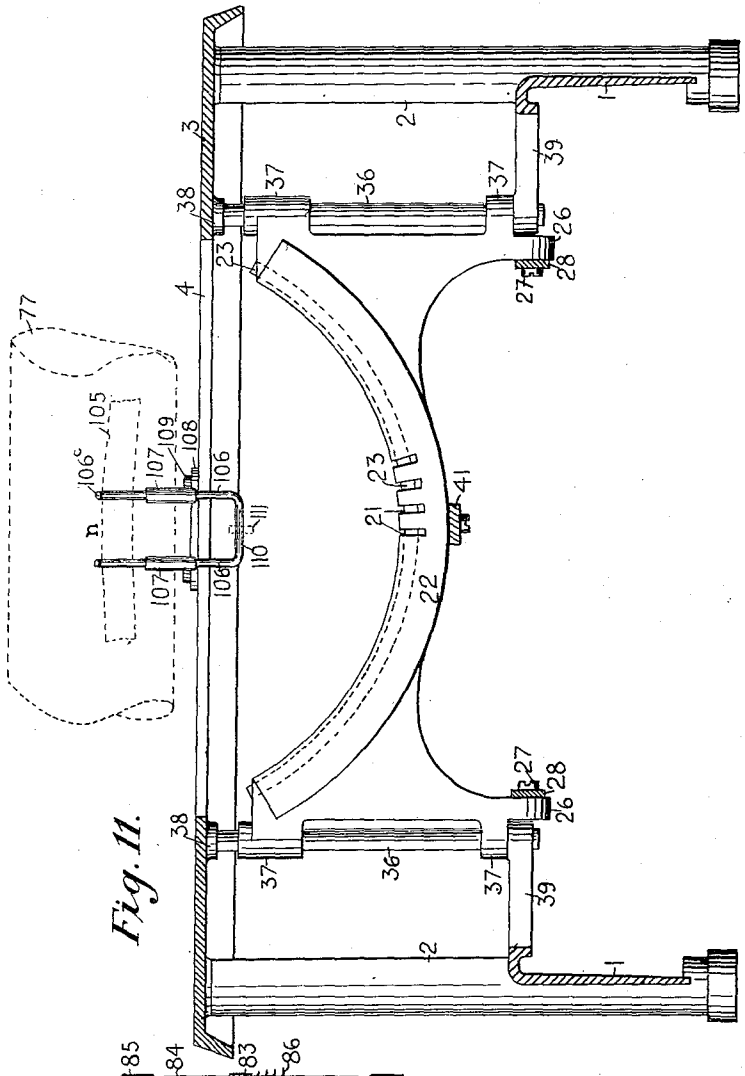
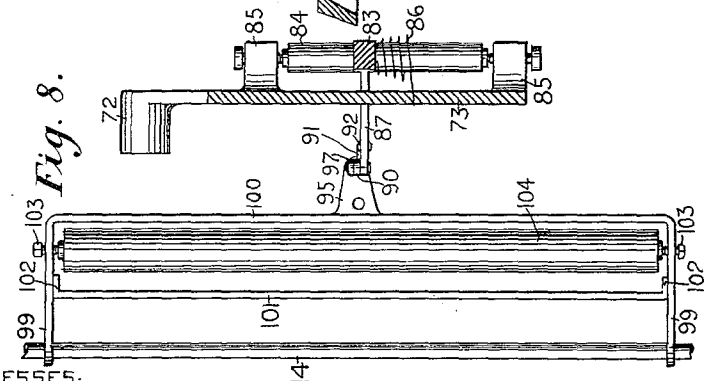


Fig. 8.



WITNESSES:
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B. B. Stickney.

INVENTOR:
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by Jacobs & Felbel
HIS ATTORNEY

UNITED STATES PATENT OFFICE.

CARL GABRIELSON, OF NEW YORK, N. Y., ASSIGNOR TO JACOB FELBEL, OF SAME PLACE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 662,147, dated November 20, 1900.

Application filed December 26, 1899. Serial No. 741,622. (No model.)

To all whom it may concern:

Be it known that I, CARL GABRIELSON, a citizen of the United States, and a resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates more particularly to the ribbon-moving mechanism of that class of type-writing machines in which the writing is done in view of the operator. It is usual to provide a ribbon-carrier in proximity to the printing-point and to give the carrier a reciprocating motion, by which it is first projected, so as to carry the ribbon over the printing-point and then returned to original or normal position, leaving the written letter uncovered. In such constructions the ribbon-carrier is given a uniform movement from a fixed normal position to a fixed working position, so that the type impressions made upon the ribbon follow a single straight path thereon, and hence the ribbon is worn only in a narrow straight line, from which the ink is soon exhausted.

One object of the present invention is to cause the ribbon to be used in widthwise as well as in lengthwise direction, and to this end the ribbon-carrier is thrown or moved varying distances from normal position, so that the ribbon does not always occupy the same position when the type impression is made, whereby the entire available width of the ribbon is used and its life is materially prolonged. Other objects of the invention will hereinafter more fully appear.

In the accompanying drawings, in which my improvements are shown adapted to a machine invented by Jacob Felbel, Figure 1 is a vertical central section from front to rear of a "front-strike" writing-machine embodying my improvements. Fig. 2 is a horizontal section taken just beneath the top plate of Fig. 1, but omitting some parts for the sake of clearness. Fig. 3 is a skeleton sectional elevation showing a modification of the ribbon-throwing devices. Fig. 4 is an enlarged perspective view of the ribbon-carrier. Fig. 5 is a sectional elevation of the ribbon-throwing devices shown at Fig. 1. Fig. 6 is an enlarged fragmentary rear view, partly in section, of adjusting devices shown at Fig. 1 as connected with the universal-bar frame. Fig. 7 is a front view of the top plate, ribbon-spools, ribbon, and ribbon-carrier. Fig. 8 is a plan of the universal-bar frame and showing its connection to the dog-rocker of the escapement mechanism. Fig. 9 is a section of ribbon, showing in dotted lines the wavy path made thereon by the types. Fig. 10 is a similar view showing in dotted lines the path made by the types with the modification illustrated at Fig. 3. Fig. 11 is a front elevation showing the shifting type-segment and its supports and also a portion of the ribbon mechanism and the platen, some of the parts being shown in section.

Throughout the drawings like parts are designated by like numerals of reference.

The frame of the machine comprises a rectangular base 1, corner-post 2, and a top plate 3, secured upon the latter and provided in its front portion with a large opening 4 for the passage of the types. Fixed in the rear portion of the base is a horizontal transverse fulcrum-rod 5, upon which are pivoted at their rear ends a series of horizontal key-levers 6 of the second order and extending to the front of the machine, their forward ends being provided with keys 7. At a point just in rear of the keys said levers are guided in a comb comprising a series of vertical pins 8, the upper ends of which are fixed in a horizontal transverse bar 9, the latter being provided upon its under side with a cushion-stop 10 for the key-levers. At a point 11 upon each key-lever about midway between the comb 8 and the fulcrum-rod 5 is pivoted an upright bell-crank 12, one arm of which extends forwardly and down beyond the key-lever and is horizontally forked at 13 to engage a horizontal transverse fulcrum-rod 14. The latter is common to all of the bell-cranks, and its ends are supported in studs 15, which project inwardly from opposite sides of the base. To the upper end of each bell-crank 12 is pivoted at 16 the rear end of a short horizontally-arranged link 17, which extends forward to a point of connection 18 with the short arm of a horizontally-arranged type-bar 19. Said bar carries at its forward end a type-block 20 and is

guided in a radial slot 21, cut upon the inner surface of a segment 22, and turns upon a pivot-wire 23, which is bent in arc form and seated in a curved slot 23ª, cut lengthwise of the segment. It will be understood that a guide-slot may be cut in a segment for each type-bar used and that the bell-cranks 12 may be made of varying lengths corresponding to the varying heights on which the type-bars are arranged in the segment. The depression of a key-lever causes a rearward movement of the vertical arm of the bell-crank, whereby the type-bar is swung up to print, the parts being returned to normal position by a spring 24, secured upon a horizontal transverse bar 25, said spring bearing up against the under edge of the key-lever.

Each type-block 20 is provided with lower-case and upper-case types, the former being arranged at the outer end of the type-block, so as normally to strike the platen. In order to enable the capital types to print, the segment 22 is made shiftable vertically, and to this end is provided with downwardly-extending arms 26, in which are inserted shoulder-screws 27, the latter being engaged by the flattened rear ends of a pair of horizontal levers 28, whose forward ends are secured, by means of hubs 29 and set-screws 30, upon a transverse horizontal rock-shaft 31, which is journaled at 32 in the side walls of the base. A forwardly-extending shift-key lever 33 is also secured upon said rock-shaft by means of a collar or hub 34 and a set-screw 35. By depressing the shift-key and rocking the shaft the levers 28 are swung upwardly, causing the segment and type-bars to rise, so that when the type-bars are operated the capital letters strike the platen. Upon release of the shift-key the segment returns by gravity to normal position. It is guided in its movements by a pair of vertical guide-rods 36, depending from the top plate, the segment being provided with laterally-projecting ears 37, which are suitably bored to engage said rods. The upward movement of the segment is limited by stops 38 and its downward movement by arms 39, which project inwardly from the top of the base and afford a support for the lower ends of the guide-rods 36. The type-basket 40 is secured to the shifting segment by means of a horizontal plate or bracket 41. It will be observed that the type-operating bell-cranks 12 do not shift with the segment, but that the forward ends of the links 17 play up and down freely to accommodate the shifting movement of the segment and the type-bars thereon.

Ribbon-spools 42 43 are arranged upon the top plate, one at each side of the machine and forwardly of the printing-point, and are secured upon the upper ends of a pair of vertical shafts 44 45, journaled in depending bosses 46. Carried by the lower ends of the shafts are beveled pinions 47 48, which mesh with smaller pinions 49 50, secured upon the forward ends of parallel horizontal shafts 51 52, the latter being journaled in the lower ends of two pairs of depending arms 53. These shafts are provided at their rear ends with beveled pinions 54 55. Arranged immediately in rear of the last-mentioned pinions is a horizontal transverse rotary driving-shaft 56, journaled in depending arms 57 58 and bearing near its ends beveled pinions 59 60, the former of which is shown at Fig. 2 as in mesh with the left-hand pinion 54, so that on the rotation of the shaft 56 the ribbon is caused to wind upon the left-hand spool. The other pinion 60 on said shaft 56 is shown as out of mesh with the pinion 55, connected with the right-hand spool 43, so that the latter is enabled to run freely in paying out the ribbon. By moving the shaft 56 endwise, so as to separate the pinions 54 and 59 and throw into engagement the pinions 55 and 60 the direction of movement of the ribbon may be reversed. At its left-hand end the shaft is provided with a circumferential groove 61, with which engages a spring-pressed detent 62, suitably mounted upon a fixed block 63, the said detent serving to hold the shaft in either of its endwise positions in the usual manner. The shaft 56 is also provided with the usual crank 66, by which it may be manually rotated when it is desired to wind the ribbon rapidly upon either spool. Splined upon the shaft 56 and abutting against the left depending arm 57 is still another beveled pinion 67, which is constantly in mesh with a like pinion 68, to which is secured a ratchet-wheel 69, both the ratchet-wheel and the pinion 68 being loosely mounted, as usual, upon a spring-drum structure 70. The latter carries a spring-pressed pawl 71, so that when the drum revolves in one direction the ratchet-wheel and pinion revolve therewith to cause the ribbon to wind, and so that when the drum rotates in the opposite direction said ratchet and pinion remain stationary. The normal rotary movements of the parts are indicated by arrows at Fig. 2. The spring-drum is pivoted upon a forwardly-extending boss 72, formed upon the lower right-hand portion of a bracket 73, which depends from the under side of the top plate near the rear edge thereof. The drum is connected to a paper-carriage 74 by means of a strap 75, the carriage being indicated as sliding upon parallel rails 76 and as bearing at its forward portion a cylindrical platen 77, upon the front of which the types strike. A sheet of paper is indicated in position upon the platen at 77ª. The usual carriage-rack 78 meshes with a pinion 79, the latter being connected by a horizontal shaft to an escapement-wheel 80. A spring-pressed stepping or feeding dog 81 is arranged normally in engagement with the escapement-wheel, a detent-dog 82 being arranged in rear of and in line with the stepping-dog, as usual. Both dogs are carried upon the upper end of a vertical vibratory arm 83, which is cast integral with a transverse horizontal rock-shaft 84, the latter being journaled in

ears 85, which project rearwardly from the said vertical plate 73. A returning-spring 86 is provided for the rocker and dogs. The rock-shaft 84 also carries a forwardly-extending horizontal operating-arm 87, which is provided with an adjustable stop 88, the latter normally bearing up against the under edge of the bracket 73 by reason of the tension of the spring 86. A lateral pin 89 is secured in the forward end of said operating-arm and engages a slot 89^a, formed in the upper end of a vertical link 90. At a point about midway of its length said link is provided with a perforated ear 91, in which is hooked the lower end of a spring 92, whose upper end hooks into an eye 93, provided upon the horizontal arm 87. The link may be pulled downwardly without moving the dog-rocker until the pin 89 is engaged by the upper end of the slot 89^a. The lower end of the link has an adjustable pivotal connection with a universal-bar frame arranged below the key-levers. This connection embraces a vertical screw 94, which engages a threaded hole in the rear end of a short horizontal arm 95 of the universal-bar frame and an angle-piece, which is swiveled upon the upper end of said screw. The angle-piece comprises a horizontal plate or member 96 and a vertical member 97, to the latter of which is pivoted the lower end of the link 90. A nut 94^a locks the screw in any height to which it may be adjusted.

The universal-bar frame above mentioned consists of a pair of horizontal parallel side bars 99, which are pivoted at their forward ends upon the above-mentioned fulcrum-rod 14 and at their rear ends are united by a horizontal bar 100, preferably made in one piece with said side bars. A tie rod or plate 101, whose ends are bent at right angles at 102 and riveted to the side bars, is used to stiffen the structure. A cylindrical universal bar 104 is journaled at 103 in said side bars between the transverse bars 100 and 101 and is normally held up against the under side of the key-levers by the tension of the spring 92.

A ribbon 105 is threaded through a vertically-disposed reciprocatory carrier, arranged just forward of the platen and in proximity to the printing-center, (the latter being indicated by the letter *n* at Fig. 11,) and is thereby normally supported at a point just below the line of writing, as shown in dotted lines at said figure and also in full lines at Figs. 1 and 7. This ribbon-carrier is made of wire and bent to form a U-frame whose arms are slit to receive the ribbon, the slit dividing each vertical arm into two fingers, the forward one of which, 106^a, is the shorter. The top of the rear finger 106^b is bent over at 106^c to prevent escape of the ribbon, but not so as to touch the top of the short finger. The U-frame is guided in a pair of vertical tubular slideways 107, which are formed upon a bracket 108, secured upon the top plate by screws 109, and the vertical arms of the carrier passing through said tubular slideways, and being thereby prevented from moving in any direction other than vertically. The horizontal member 110 of the U-frame is engaged by the forward end of a horizontal operating-lever of the first order 111, which is pivoted at 112 in an ear 113, depending from the top plate. Engagement between the operating-lever and the ribbon-carrier is made at the forward end of the lever, which is provided with a slot 114 to accommodate the rectilinear movement of the ribbon-carrier as the lever moves in an arc about the axis 112. The top plate may be cut away at 112^a to form a clearance for the lever. The rear arm of the lever is operated by a vertically-arranged link 115, whose lower end is provided with an adjustable pivotal connection, like that of the link 90, to the same arm 95 of the universal-bar frame, the link 115 being arranged forwardly of the other and its pivotal point being designated at 116. The upper end of the link 115 is provided with a lateral pin or stud 117, which engages a horizontal slot 118, formed in the rear arm of said operating-lever 111, the extreme right-hand end of said slot being enlarged at 118^a to permit the entrance of the head of said stud when the latter is being inserted in the slot. The link is adapted to swing about its pivot 116 to cause the said stud to move to different parts of the slot, so as to engage the lever at different distances from its fulcrum. The slot is cut upon an arc struck from said pivot 116, so that the normal position of the lever 111 is always the same no matter how the link 115 may have been swung. A downward pull of the link 115 causes a vibration of the lever 111 and an ascent of the device 106 and the ribbon carried thereby. It will be understood that the extent of movement of the lever, carrier, and ribbon can be varied by swinging the link about the pivot 116, inasmuch as the vertical movement of the link is the same at each key depression.

As a means for swinging the link to cause variations in the throw of the ribbon, the former is provided with a bent arm 115^a, which branches forwardly from the link and then downwardly parallel with the body of the link, so as to form an open slot. An eccentric 119 is secured by a screw 120 upon the transverse ribbon-winding shaft 56, and the front edge of the link and the rear edge of its arm engage said eccentric, said edges being of course parallel and substantially vertical, so that the link has a sliding connection with the eccentric and may move freely up and down at all times. As shown at Fig. 2, the eccentric has a wide working face or periphery, so as to compensate for the movement of the shaft 56 as the latter is shifted endwise, so that the eccentric is never disengaged from the link. It will be observed that during the rotation of the shaft the eccentric 119 is slowly turned, and hence causes the link 115 to swing slowly upon the pivot 116 without, however, affecting the vertical movements of said link, so

that as the point of engagement of the link with the lever 111 is shifted the throw of the lever and of carrier 106 is constantly varied, and hence the working position of the ribbon is also varied.

As shown by dotted lines at Fig. 1, at the depression of any key-lever 6 its bell-crank 12 is swung rearwardly, and through the link 17 swings the type-bar to the printing-point. The key-lever also forces down the universal bar 104, which through the arm 9 causes the link 115 to descend, pulling down the slotted rear arm of the ribbon-throwing lever 111 and causing the front arm thereof to rise and move the ribbon-carrier and ribbon up, so that the ribbon covers the printing-point. At the same time the link 90 descends, expanding the spring 92, until the upper end of the slot contacts with the pin upon the forward end of the dog-rocker arm 87, whereupon the continued descent of the link 90 causes the dog-rocker to swing and the upright arm thereof to vibrate forwardly, so that the spring-pressed feeding-dog 81 is, as usual, disengaged from the escapement-wheel 80 and is moved independently past said tooth, the latter being temporarily engaged by the detent-dog 82, no movement of the wheel occurring at this time. During the movement of the dog-rocker the spring 86 is put under tension. Upon the relief of the finger-key 7 from pressure the key-lever spring 24 returns the key-lever, bell-crank, link, and type-bar to normal position. The spring 86 returns the dog-rocker to normal position, and also, through the arm 87 and link 90, lifts the universal-bar frame until the adjustable stop 88 upon the arm 87 contacts with the under edge of the bracket 73, whereupon the movement of the dog-rocker ceases. At this time the universal-bar frame has not reached normal position, but its return movement is completed by the spring 92. Both of said springs 86 and 92 also assist in returning the key-lever and type-bar. At the same time the link 115, together with lever 111 and ribbon-carrier 106, returns to normal position, the ribbon dropping to a point below the line of writing. During the return of the dog-rocker the detent-dog 82 is disengaged from the wheel and the stepping-dog 81 is reëngaged therewith, and the wheel is thereby permitted to rotate to the extent of one tooth, so that the paper-carriage advances a letter-space under the tension of the spring-drum 70. The movement of the spring-drum is communicated through pawl 71 and ratchet 69 to the pinion 68, and thence through pinion 67, shaft 56, pinions 59 and 54, shaft 51, pinions 49 and 47, and shaft 45 to the spool 42, causing the ribbon to wind slightly thereon and to also pay off from the other spool 43. At the operation of other finger-keys 7 the described movements are repeated and the ribbon is still further wound upon spool 42. When the end of the line of writing is reached, the carriage is returned, as usual, for beginning a new line, and also for rewinding the spring in the drum 70; but during this return movement there is no motion of any part of the ribbon or type operating mechanism. As soon as the ribbon is all wound upon one spool the shaft 56 may be moved endwise to separate the pinions 54 and 59 and cause the pinions 60 and 55 to engage, whereupon the ribbon will wind upon the spool 43. As the shaft 56 is caused to rotate in the described manner, the eccentric 119 thereon is given a corresponding step-by-step rotary movement, so that link 115 is during its vertical movements gradually swung forwardly from the full-line position indicated at Fig. 1 to that indicated at Fig. 5 and then rearwardly again to the position at Fig. 1, and so on, so that the pin 117 is caused to work in different parts of the slot 118, and hence the ribbon is thrown varying distances from normal position during the winding thereof. When the pin 117 works in the rear portion of the slot 118 in the ribbon-throwing lever, as shown at Fig. 1, the vertical movement of the link 115 causes the ribbon to be thrown to the dotted-line position indicated in Fig. 7 at 105^b, this being the lowest position to which the ribbon is thrown, and the type (indicated by 20^a at said figure) strikes the ribbon at a point close to the upper edge thereof. In the position of the parts illustrated at Fig. 5, where the pin 117 is at its nearest approach to the fulcrum 112 of the ribbon-throwing lever, the movement of said lever is greatest, and the ribbon is thrown then to the top position, (indicated at 105^a, Fig. 7,) and the type consequently strikes the ribbon at a point near the lower edge thereof. The normal position of the ribbon is indicated in full lines at said figure. The wavy path followed by the type impressions upon the ribbon is indicated in dotted lines at Fig. 9, said path being independent of the return movements of the carriage, and therefore continuous whether long or short lines are written on the paper. As the ribbon winds back and forth, there is an intersection of the curved or sinuous paths made by the types, so that the ribbon is worn with substantial uniformity throughout its available width.

In order to provide for frequent intersection of the curved paths, it is desirable that they be in the form of short waves, and to this end the pinion 49 is made smaller than the pinion 47, so that the vibration or adjustment of the link 115 about the pivot 116 occurs oftener, in proportion to the amount of ribbon wound upon the spool, than would be the case if the said pinions were of equal size. The movement of the ribbon-winding device may be otherwise reduced in proportion to the movement of rotary device 119, which controls the throw of the ribbon.

Inasmuch as the entire type system is moved vertically at the type-shifting operation it follows that both the upper-case and lower-case characters print in the same spot,

not only upon the platen or the paper thereon, but also upon the ribbon. Hence it will be seen that by a simple and inexpensive mechanism a narrow ribbon, such as is employed in this class of machines, is adapted not only for use in connection with shifting types, but is also adapted to be worn in widthwise as well as in lengthwise direction.

Referring now to Fig. 3, it will be observed that a triangular eccentric or cam 121 is substituted for the plain eccentric 56 and that the arm 115^c of the link 115^b branches upwardly instead of downwardly. The construction of this three-faced eccentric or cam is such that the link positively engages it at all points in its rotation and is given three vibrations at each rotation of the shaft 56, so that the path followed by the types in the ribbon is made up of a succession of very short waves, as indicated by dotted lines at Fig. 10. The lower end of the link is pivoted at 116^a to a stud 116^b, which projects rearwardly from the stiffening-bar 110 of the universal-bar frame. As the horizontal movement of the pin 117^a is less than in the other drawings, the slot 118^a in the lever 111^a is shortened, as is also the lever itself, and the pivot 112 is moved forward a corresponding distance. The proportions of the parts are such, however, that the ribbon is moved from the same normal position to the same limits, (indicated by dotted lines 105^a and 105^b at Fig. 7.)

Referring more particularly to Fig. 1, it will be observed that the movement of the ribbon-throwing devices, including the universal bar, begins at the initial portion of the key depression; but owing to the pin-and-slot connection of the link 90 to the dog-rocker the latter remains stationary until the key has been partly depressed and is therefore operated during the last part of the key-stroke. Hence the dog-rocker is enabled to return to normal position during the initial part of the return stroke of the key in readiness for immediate operation of a succeeding key, it being understood that in most instances the types can pass each other at a point about half-way between the type-basket and the platen, and hence that a second key can be operated before the first is fully released. By means of the adjustable connection of the link 90 with the universal-bar arm the feeding mechanism may be so timed as to permit the escapement movement of the carriage to occur at the earliest practicable moment during the return of a key. The adjustable connection of the link 115 with the universal-bar arm enables said link, and hence the ribbon-carrier, to be adjusted vertically, so that the upper edge of the ribbon may normally lie at the desired position just below the line of writing. This adjustment is of importance, because if the ribbon should normally stand too high it would not only obscure and increase the difficulty in making corrections upon the paper, but it would also overthrow at times, so that the type would strike upon the edge of the ribbon and make a blurred impression, or perhaps strike wholly off the ribbon and make no impression, and it will be seen that by means of the described adjustment this difficulty is avoided.

It will be observed that devices are operated by the keys through the universal bar for moving the ribbon from normal to working position, said devices comprising the link 115 and the lever 111, operated thereby, and that the ribbon-winding mechanism is provided with a controller, as 119, which operates through said link and lever for automatically causing the ribbon to be moved variable distances. It will also be noted that said controlling device has a step-by-step movement in a single rotary direction.

My improvements may be carried out in many different ways, and I do not, therefore, wish the invention to be considered as limited to the specific details of construction and arrangement herein set forth. Said improvements may be adapted to other than front-strike machines, and portions of the invention may be used without others.

So far as I am aware I am the first to automatically move the ribbon transversely during the operation of the keys, so that it is used in widthwise direction in what is known as a "visible-writing machine," wherein the ribbon normally stands away from the printing-point and by the operation of any key is adapted to be thrown or moved over so as to cover the printing-point. Such visible-writing machines are known as "top-strike" machines and "front-strike" machines. While I have shown a narrow ribbon and prefer to use the same, it will be understood, of course, that a ribbon of greater width may be employed, if desired.

While I have shown my invention embodied in a machine in which the types shift in printing upper-case characters, it will of course be understood that the same may be embodied in a machine wherein the platen shifts, as is more commonly the case.

While I have shown ribbon-spools arranged on each side of the printing-point and have so organized the mechanism as that the ribbon is moved in a right line and edgewise to cover and uncover the printing-point, because I have in practice thus far carried out my invention in this manner, it will nevertheless be understood that these several features are not essential in so far as my invention broadly is concerned.

Certain of the features of construction herein illustrated and described are the invention of Jacob Felbel; but

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

1. In a visible-writing machine, the combination with a ribbon normally removed from and disclosing the printing-point, of means for automatically moving the ribbon crosswise variable distances over said printing-point,

whereby the ribbon is used transversely of its length.

2. In a visible-writing machine, the combination with a ribbon normally removed from and disclosing the printing-point, of means for automatically moving the ribbon crosswise variable distances over said printing-point during the operation of the character-keys one after another.

3. In a visible-writing machine, the combination with a ribbon normally removed from and disclosing the printing-point, of means for automatically moving the ribbon crosswise variable distances over said printing-point, whereby the ribbon is used transversely of its length, and means for moving said ribbon simultaneously in a lengthwise direction.

4. In a visible-type-writing machine, the combination with a platen, a series of types, a ribbon, and means for winding the same, of means for variably moving the ribbon to and away from the printing-point at each type impression in such a manner that the types follow a continuous wavy path determined by the ribbon-moving mechanism.

5. In a visible-type-writing machine, the combination with a carriage, means for propelling the same, a series of types, and a ribbon-winding mechanism, of means controlled by the ribbon-winding mechanism for moving the ribbon variably to and from the printing-point so that the ribbon is used both widthwise and lengthwise.

6. In a visible-type-writing machine, the combination with a platen, a series of types, and a ribbon-winding mechanism, of means for moving the ribbon to and from the printing-point and means for varying such movement automatically so as to cause the ribbon to be used widthwise as well as lengthwise, the operation of the last-mentioned means being independent of the carriage-return movements, so that the path marked by the types upon the ribbon is continuous whether long or short lines are being written on the paper.

7. In a visible-type-writing machine, the combination with a platen, a series of types, and a ribbon-winding mechanism, of means for holding the ribbon in a normal position which affords a view of the printing-point and for moving it automatically varying distances from said normal position over the printing-point.

8. In a visible-type-writing machine, the combination with a platen, a series of types, and a ribbon-winding mechanism, of means for holding the ribbon in a normal position which affords a view of the printing-point and for automatically moving it varying distances from said normal position over the printing-point.

9. In a visible-type-writing machine, the combination with a platen and a series of types, of a pair of ribbon-spools and winding means therefor, a ribbon-carrier arranged in proximity to the printing-point, means for moving the carrier to and from the printing-point, and means for varying the length of throw of the carrier during the operation of the types.

10. In a visible-type-writing machine, the combination with a platen and a series of types, of a pair of ribbon-spools and winding means therefor, said spools being arranged one on either side of the printing-point, a ribbon-carrier arranged between the spools in proximity to the printing-point, means for moving the carrier independently of the spools to and from the printing-point, and means for varying the length of throw of the carrier during the operation of the types.

11. In a type-writing machine, the combination with a platen and a series of types adapted to strike in front thereof, of a pair of ribbon-spools and winding means therefor, said spools being arranged one on either side of the printing-point, a ribbon-carrier arranged between the spools in proximity to the printing-point, means for moving the carrier vertically at each type impression so that the ribbon covers the printing-point, and means for automatically varying the vertical movement of said carrier.

12. In a visible-type-writing machine, the combination with a platen, a series of types, a series of keys therefor, and a ribbon-winding mechanism, of means operated by the keys for moving the ribbon to and from the printing-point, and means controlled by said ribbon-winding mechanism for varying said to-and-fro movement of the ribbon.

13. In a type-writing machine, the combination with a carriage, a series of types, a series of keys therefor, a letter-spacing mechanism for said carriage including a universal bar operated by said keys, and a ribbon-winding mechanism, of means actuated by said universal bar for moving the ribbon to and from the printing-point, and means connected to said ribbon-winding mechanism for varying said to-and-fro movement of the ribbon.

14. In a visible-type-writing machine, the combination with ribbon-winding mechanism and ribbon-throwing mechanism which moves the ribbon from a normal position away from the printing-point to one covering the same, of a device constructed to have a step-by-step movement in a single rotary direction and to cause variations in the operation of the ribbon-throwing mechanism, so that the ribbon is moved to different working points and is used in widthwise as well as lengthwise direction.

15. In a visible-type-writing machine, the combination with ribbon-winding mechanism, of a ribbon-carrier, means for moving said carrier to and from the printing-point, and a device constructed to have a step-by-step movement in a rotary direction and connected to the said carrier-moving means and adapted to cause the latter to move said carrier variable distances.

16. In a visible-type-writing machine, the

combination with a ribbon-carrier and means for moving said carrier to and from the printing-point, of a ribbon-winding mechanism and a controller operated thereby for causing said carrier-moving means to move said carrier variable distances from normal position.

17. In a visible-type-writing machine, the combination with ribbon-winding mechanism, of a lever adapted to move the ribbon to and away from the printing-point, and means for automatically altering the throw of said lever so as to cause the ribbon to be used widthwise.

18. In a visible-type-writing machine, the combination with a lever adapted to move the ribbon to and away from the printing-point, of a ribbon-winding mechanism and a controller operated thereby for altering the throw of said lever so as to cause the ribbon to be used widthwise as well as lengthwise.

19. In a type-writing machine, the combination with ribbon-winding mechanism, of a lever provided with means for carrying the ribbon, an operating device for said lever, means for causing said operating device to engage said lever at different distances from the fulcrum of the latter, and means for giving the operating device uniform movements so as to cause the lever to move varying distances.

20. In a type-writing machine, the combination with a series of type-operating keys, of a universal-bar frame, a link connected thereto, a ribbon-throwing lever, and means for enabling said link to engage said lever at different distances from its fulcrum.

21. In a type-writing machine, the combination with ribbon-winding mechanism, including a shaft, of an eccentric on said shaft, the universal-bar frame of the type-operating and carriage-feeding mechanism, a link connected to said universal-bar frame and to said eccentric, a lever controlled by said link, and a ribbon-carrier connected to said lever.

22. In a type-writing machine, the combination with ribbon-winding mechanism, including a transverse shaft, of an eccentric on said shaft, a universal reciprocatory frame connected to the type-operating mechanism, a link connected to said universal frame and provided with a forked portion which engages said eccentric, a slotted lever, means upon said link for engaging the slot in said lever, and a ribbon-carrier connected to said lever.

23. In a type-writing machine, the combination with ribbon-winding mechanism, of a ribbon-throwing lever provided with a slot, a link engaging said slot and also pivoted to an operating device, said slot being curved concentrically to said pivot, and means for swinging said link upon said pivot and also for moving said link to cause vibrations of said lever.

24. In a type-writing machine, the combination with ribbon-winding mechanism, of a ribbon-throwing lever, a universal bar connected to the type-operating mechanism, and an automatically-varying connection from said universal bar to said lever, whereby the movement of said lever may be varied.

25. In a type-writing machine, the combination with ribbon-winding mechanism including a transversely-arranged winding-shaft, of a series of type-operating key-levers, a universal-bar frame arranged below said levers, a vertical link pivoted at its lower end to said universal-bar frame and provided with a forked portion, an eccentric upon said transverse shaft engaging said forked portion, a horizontal lever of the first order having a slotted rear arm with which the upper end of said link engages, and a vertically-arranged ribbon-carrier engaging the forward end of said lever.

26. In a type-writing machine, the combination with type-operating mechanism and ribbon-winding mechanism, of a universal-bar frame connected to said type-operating mechanism, a link adjustably connected to said universal-bar frame, and a ribbon-throwing device operated by said link.

27. In a type-writing machine, the combination with type-operating mechanism and ribbon-winding mechanism, of a universal-bar frame, a ribbon-throwing device positively connected thereto so as to be operated during the entire movement thereof, and carriage-feeding devices having a lost-motion connection to said universal-bar frame, so as to be operated only during the final portion of the initial movement of said universal-bar frame.

28. In a type-writing machine, the combination with type-operating mechanism and ribbon-winding mechanism, of a universal-bar frame, a ribbon-throwing device positively connected thereto so as to be operated during the entire movement thereof, and carriage-feeding devices having an adjustable lost-motion connection to said universal-bar frame, so as to be operated during as much of the final portion of the initial movement of said universal-bar frame as may be determined by said adjustment.

29. In a type-writing machine, the combination with a series of type-operating levers, of a universal-bar frame operated thereby, a link connected to said universal-bar frame, a ribbon-throwing device operated by said link, a second link also connected to said frame, and carriage-feeding devices adapted to be operated by said second link during only the final part of the downward motion of any key-lever.

30. In a type-writing machine, the combination with a series of type-operating levers, of a universal-bar frame operated thereby, a link adjustably connected to said universal-bar frame, a ribbon-throwing device operated by said link, a second link also adjustably connected to said frame, and carriage-feeding devices having a lost-motion connection to said universal-bar frame through said second link.

31. In a type-writing machine, the combination with a carriage and a series of type-operating levers, of a universal-bar frame operated thereby, a ribbon-throwing device connected thereto, a dog-rocker having an independent lost-motion connection to said universal-bar frame, a returning-spring for said dog-rocker, means for arresting said dog-rocker in its return movement before the arrest of said universal-bar frame, an independent spring for said universal-bar frame, and a carriage-escapement rack to engage the said dog-rocker.

32. In a type-writing machine, the combination with a carriage and a series of type-operating levers, of a universal-bar frame operated thereby, a ribbon-throwing device connected to said universal-bar frame, a dog-rocker having an independent lost-motion connection to said universal-bar frame, a carriage-escapement rack controlled by said dog-rocker, a returning-spring for said dog-rocker, means for arresting said dog-rocker in its return movement before the arrest of said universal-bar frame, and an independent returning-spring for said universal-bar frame arranged between said frame and said rocker.

33. In a type-writing machine, the combination of a series of key-levers, a vertical bell-crank pivoted to each key-lever and operatively connected to a type-bar, a fulcrum-rod common to all of said bell-cranks, a universal-bar frame pivoted upon said fulcrum-rod, a ribbon-throwing device connected to said universal-bar frame, and carriage-feeding devices also connected to said universal-bar frame.

34. In a type-writing machine, the combination with a platen, a series of types, means for moving the types to the platen, and means for shifting the types transversely of the platen, of a ribbon-winding mechanism and a ribbon-throwing mechanism, the latter including means for moving the ribbon from non-working to working position, and also including means for causing the ribbon to be used automatically in widthwise as well as lengthwise direction.

35. In a visible-writing machine, the combination with a ribbon normally removed from and disclosing the printing-point, of ribbon-moving means actuated by the character-keys and adapted to move the ribbon crosswise automatically variable distances over said printing-point.

36. In a visible-writing machine, the combination with a ribbon which normally stands away from and exposes the printing-point, of automatically-operating means for causing the ribbon to move edgewise to cause different transverse portions thereof to cover the printing-point and to return to a position uncovering said point at each action of the character-keys.

37. In a type-writing machine, the combination with a ribbon-carrier of automatically-operating means for moving said carrier at each key-stroke from a uniform normal position variable distances across the printing-point.

38. In a type-writing machine, the combination with a series of types and a ribbon-carrier of automatically-operating means for moving said carrier at successive key-strokes gradually increasing and decreasing distances across the printing-point from a uniform normal position, said carrier returning to said normal position after each type impression.

Signed in the borough of Manhattan, city of New York, in the county of New York and State of New York, this 23d day of December, A. D. 1899.

CARL GABRIELSON.

Witnesses:
B. C. STICKNEY,
K. V. DONOVAN.