F. W. HILLARD.

TYPE WRITING MACHINE.

APPLICATION FILED AUG. 25, 1896.

1,025,089.

Patented Apr. 30, 1912.

4 SHEETS—SHEET 1.

Fig. 1.

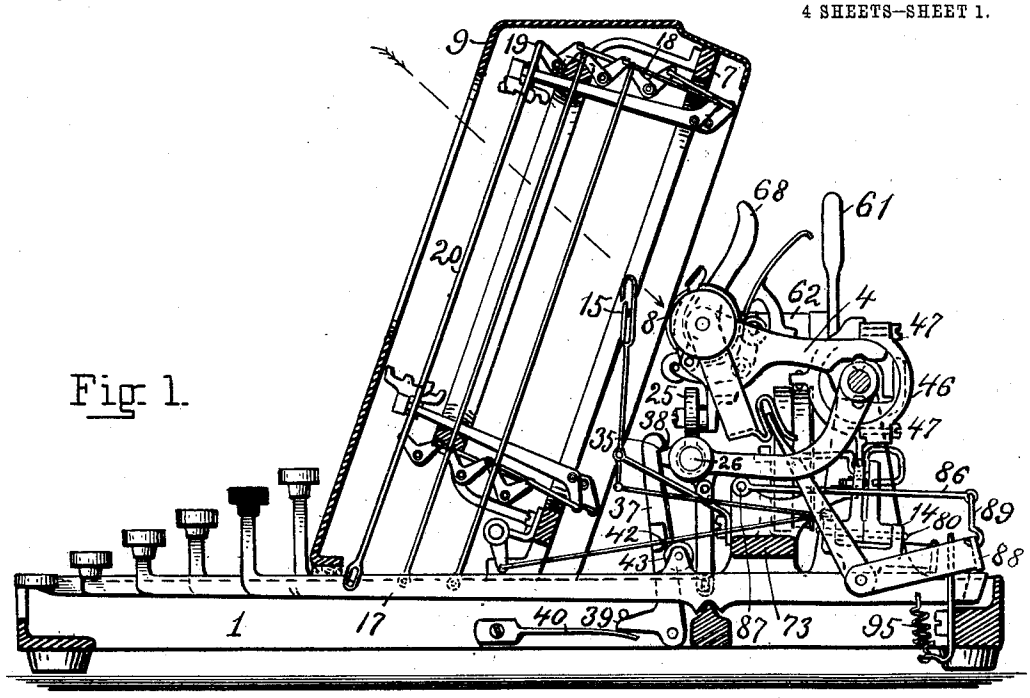
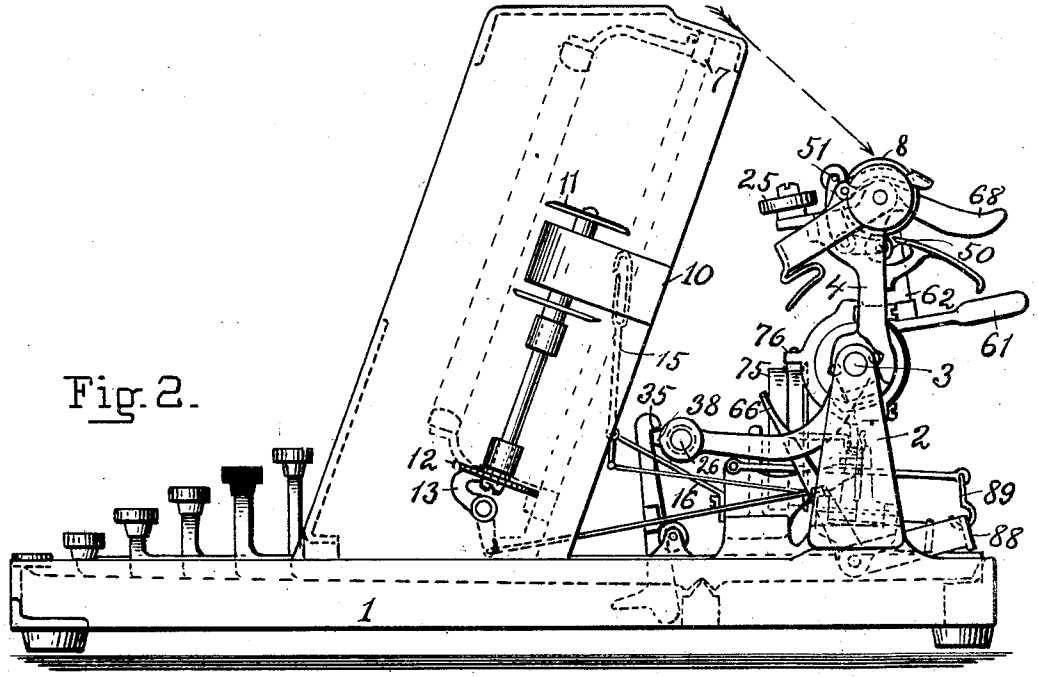



Fig. 2.

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4 SHEETS—SHEET 2.

Fig 3.

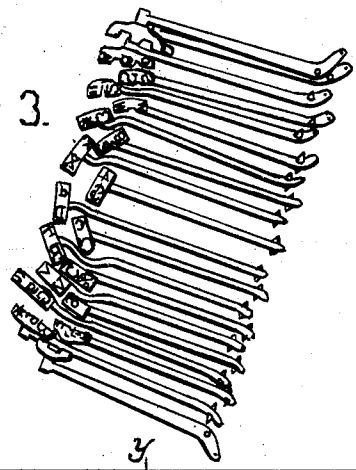
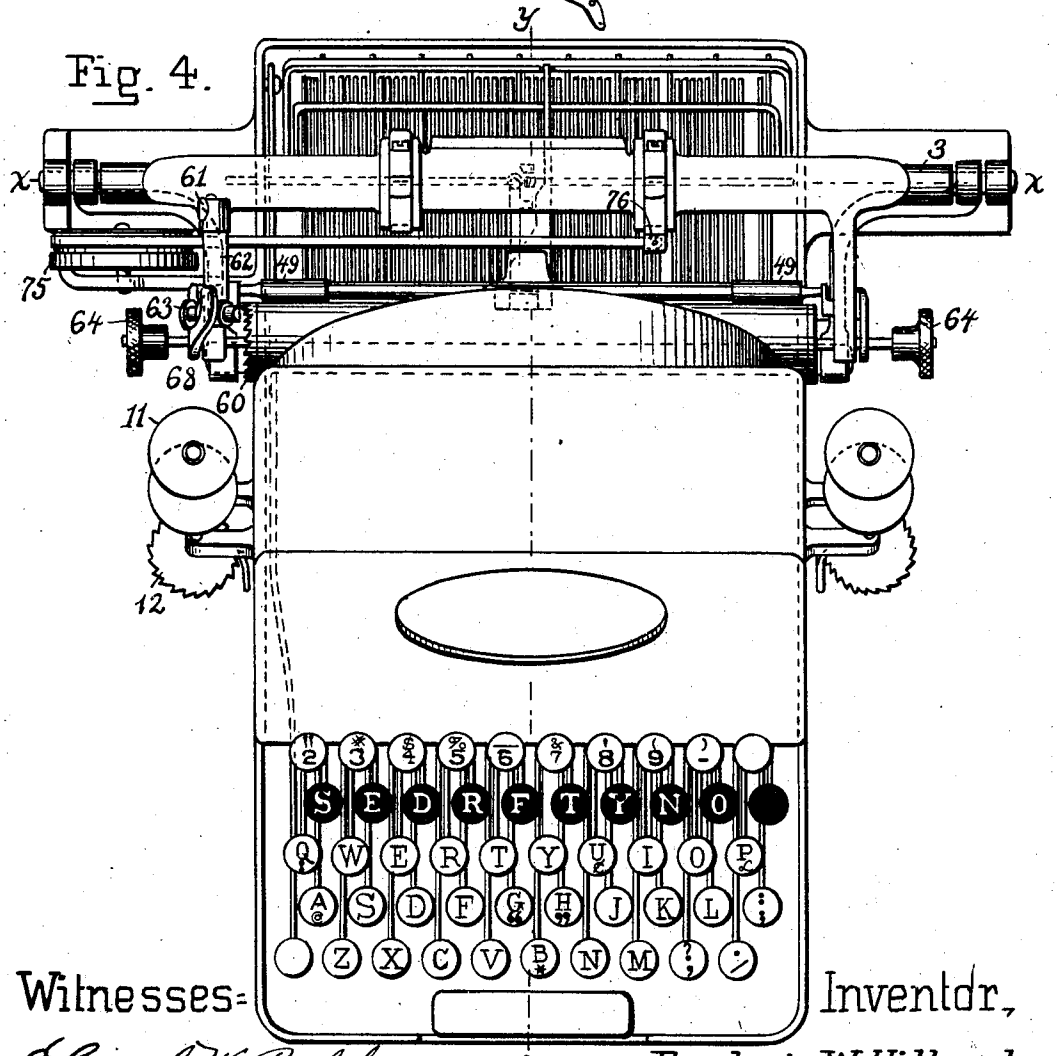


Fig. 4.

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4 SHEETS—SHEET 3.

Fig. 5.

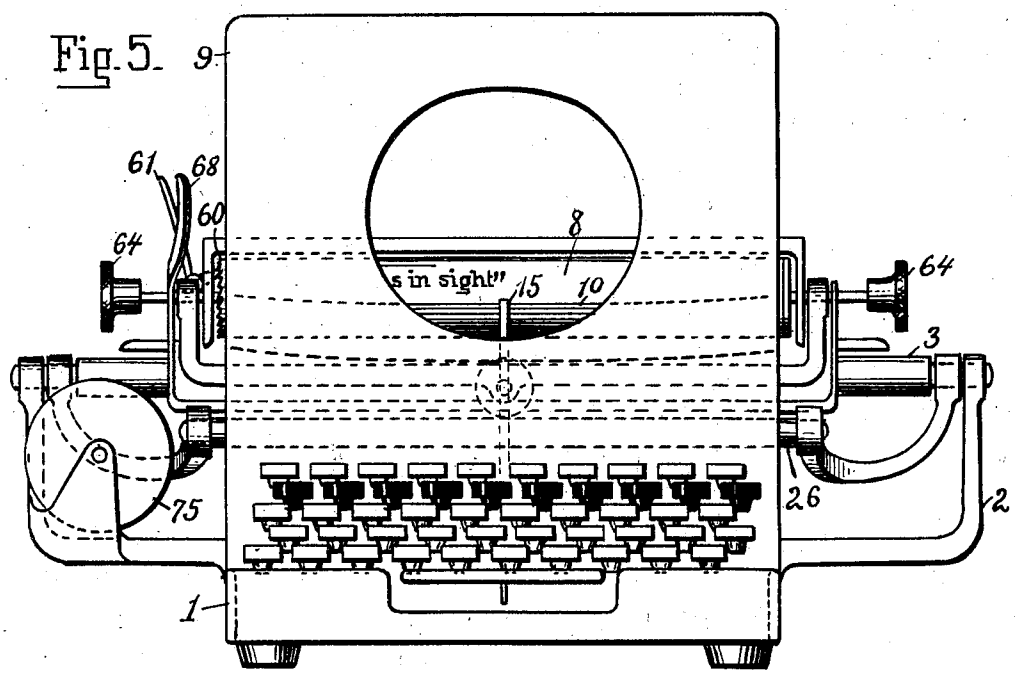



Fig. 6.

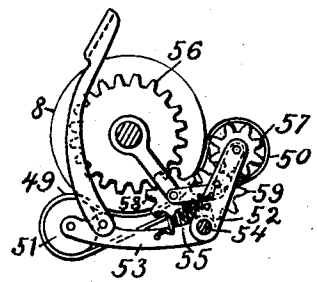
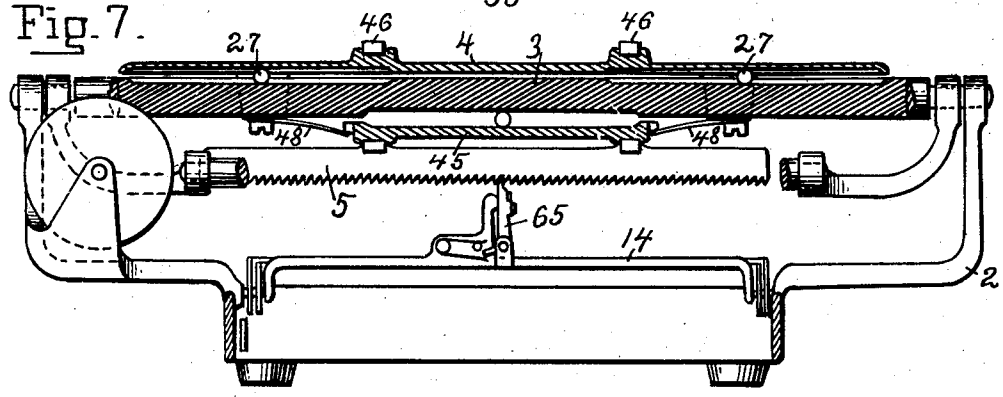



Fig. 7.

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4 SHEETS—SHEET 4.

Fig. 8.

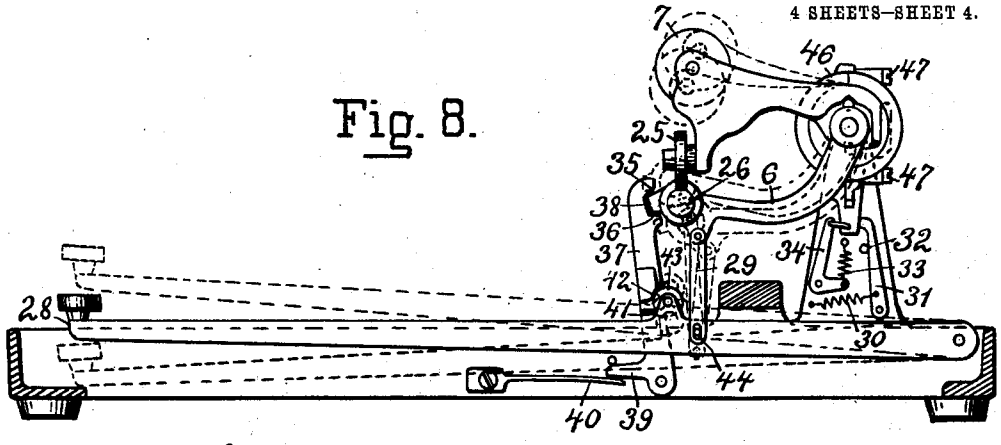



Fig. 9.

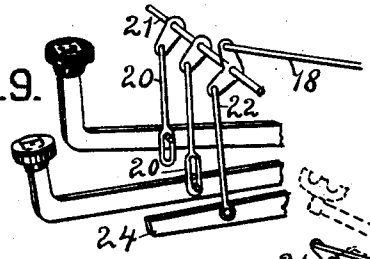



Fig. 10.




Fig. 11.

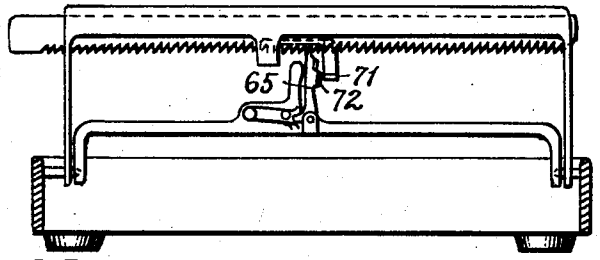
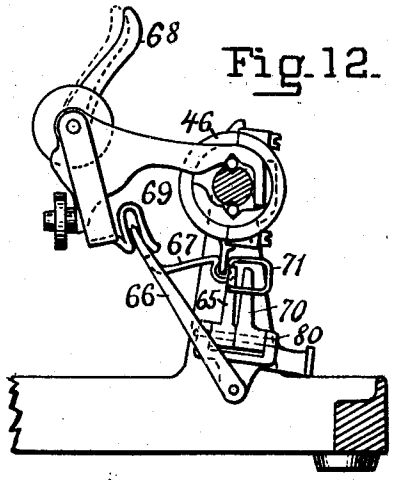



Fig. 12.




Witnesses=

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# UNITED STATES PATENT OFFICE.

FREDERIC W. HILLARD, OF TOTTENVILLE, NEW YORK.

## TYPE-WRITING MACHINE.

1,025,089. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed August 25, 1896. Serial No. 603,845.

*To all whom it may concern:*

Be it known that I, FREDERIC W. HILLARD, a citizen of the United States of America, and residing at Tottenville, county of Richmond, State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention is an improvement in type-writing machines, its primary aim being to produce a typewriter with the double advantage of printing in sight and with a whole type ring or ample room in which to pivot the type bars.

Typewriters heretofore constructed are divisible into two classes, viz., those in which the printing is done out of sight but which are provided with whole type rings or ample room for the type bars, and those which print in sight but which are only provided with arcs of type rings for the type bars.

My invention combines the advantages of each of the two classes without their disadvantages.

In pursuance of a requirement of division of the Patent Office, the claims of this application are limited to carriage and platen shifting mechanisms; and the other features shown and described herein are claimed in my other pending applications, which are divisions hereof, filed and serially numbered as follows: Serial No. 727,275, filed Aug. 15, 1899; Serial No. 130,756, filed Nov. 10, 1902; Serial No. 232,251, filed Nov. 10, 1904, (Patent No. 923,120, granted March 25, 1909); Serial No. 233,366, filed Nov. 18, 1904, (Patent No. 923,121, granted March 25, 1909); Serial No. 234,065, filed Nov. 23, 1904; Serial No. 485,147, filed March 22, 1909.

The carriage and platen shifting mechanisms invention claimed herein relate especially to the class of machines commonly designated and known as front strike type-writers; and the machine shown herein comprises a carriage supported at the front and rear on parallel guide rails, the front rail being at one level and the rear one at a higher level. The carriage is adapted to travel endwise on the rails, lengthwise thereof across the machine, in the horizontal plane of the machine, and is provided with a platen movable endwise with the carriage and shiftable by a vibratory movement oblique to the horizontal plane of the machine and transverse the line of the carriage feed, and on which the writing is effected at the impression point on a line between the front side and top.

The platen is supported normally in writing position by two pairs of obliquely arranged arms or links; the arms all being pivotally mounted at their rear ends concentrically with the rear guide rail; one pair of said arms extending obliquely upward and having journaled between them, at their front ends, the platen; and the other pair extending obliquely downward and having journaled between them, at their front ends, the front guide rail. Key actuated and spring actuated means are provided for normally maintaining the lower pair of arms and the front guide rail at their normal level and for moving them to one or more shifted levels; such means also operating, through suitable mechanism, for normally maintaining the platen at its lower case printing level and for moving it to its shifted levels. The two pairs of arms, the platen and the two guide rails are all so connected together that in such shifting movements they all swing or rotate together, to vibrate the platen from one level to another; both pairs of arms swinging through equal arcs in such movement. The said vibratory, shifting movement of the platen is effected, at any portion of the endwise travel of the carriage along the guide rails, by the shift key and by the platen balancing and lifting mechanism, the latter comprising levers actuated by springs; such shift key and spring mechanism constituting a means adapted to rotate the guide rails about the axis of the rear guide rail as a pivot, and to thus shift the platen to a plurality of different levels and to two or more printing levels. In the machine shown the said spring mechanism serves to normally maintain the platen at its lower case printing level; and the platen is adapted to be lowered therefrom to the upper case printing level by the depression of the shift key; and, on the release of the depressed shift key, the platen is again automatically lifted to lower

case printing level by the said spring mechanism. The platen is adapted to be lifted above its lower case printing level by the lifting of the shift key, the shift key being adapted to be both lowered and lifted in the machine from the position in which it is normally held by its spring mechanism; and this latter lifting movement of the platen is assisted, but not automatically effected, by the said platen lifting spring mechanism. The platen is also adapted to be swung at will by hand, independently of the shift key and platen lifting spring mechanism, up off from the front guide rail and thus oscillated to a still higher level, about the axis of the rear guide rail, at any portion of the endwise travel of the carriage along said rails, to bring the line of print to such higher level, as for inspection and correction purposes, and to a position where the printed line will be in view of the operator throughout its whole length; and in this latter movement the upper pair of arms, the rear guide rail and the platen rotate together, independently of the lower pair of arms and the front guide rail, which remain stationary.

In the accompanying drawings which form a part of this specification, Figure 1 is a detail side elevation of my type writing machine, some of the parts being cut away in longitudinal section to more clearly show the mechanism of the machine. Fig. 2 is a side elevation with all the parts in place, excepting that some details are omitted. Fig. 3 is a detail view of the type bars belonging to the left side of the machine, grouped together as they appear when in place in the type ring. Fig. 4 is a plan view of the machine. Fig. 5 is a front view, showing the machine as it appears to the operator. In this view the mechanism for feeding the inking ribbon is omitted. Fig. 6 is a detail of the platen and feed roll geared together. Fig. 7 is a vertical section on lines X—X of Fig. 4, showing the ball bearings for the carriage. Fig. 8 is a detail view of the platen shifting mechanism, showing the positions of the parts in their normal state in full lines, and the positions of most of the parts in their two shifted states in dotted lines. Fig. 9 is a detail view of a rock shaft which connects the same type bar with three levers, and of the connecting wire between the rock shaft and the type bar, and the two slotted connecting wires which extend to two key levers, and the wire which forms the connection between the type bar and the carriage propelling power. Fig. 10 is a longitudinal section of a side elevation of some of the parts shown in Fig. 1, showing the type bar, rock shaft and connecting wires illustrated in Fig. 9, as they appear in the machine. Figs. 11 and 12 are front and side elevations of the mechanism for rocking the rack forward out of engagement with the dogs to release the carriage from the escapement, and showing the holder on the rack guide for preventing the normally engaging dog from spacing backward when the rack has been swung inwardly far enough to disengage it from the dog.

Fig. 1 shows a sectional view of the base frame, 1. Extending in a perpendicular direction from the back portion of the base frame are the brackets 2 for the carriage guide rail 3 and the parts mounted on the guide rail. The principal parts which are mounted on the guide rail are the paper carriage 4, the rack 5 (Fig. 7), and the carriage shifting frame 6 (Fig. 8). At the front of the machine is placed the key board. Intermediate between the paper carriage and the key board the type bar plate 7 is mounted on the base frame of the machine. The type bar plate inclines backward at a slight angle from the perpendicular plane. Fig. 1 shows a sectional view of the type bar plate, taken on the line Y Y of Fig. 4. The type bar plate comprises a ring with type bars mounted concentrically thereon and pivoted in the usual manner so that they can all strike through the central opening in the ring to a common printing center on the platen 8. The type bar plate is inclined slightly backward from the perpendicular in order that the line of vision between the operator on the machine and the printing center may be clear and unobstructed. There is a central opening through the casing 9 which guards the type bar plate. Through this central opening the writing on the platen may be clearly seen by the operator as soon as each letter has been printed. This is clearly shown in Fig. 5, which shows the printing as it appears to the operator. By this arrangement I am enabled to secure a whole type ring or ample room in which to pivot the type bars, and I also secure the additional advantage of printing in sight. Heretofore type writing machines have either been constructed to print out of sight or else the type bars have all been mounted in only one half and generally considerably less than one half of the type ring. By my present construction I have secured the advantages of both classes of machines without their disadvantages.

In order to fully carry out my design of machine I use the following additional features: The inking ribbon 10 is mounted on the spools 11 and is fed from one spool to the other by the ratchets 12 and the pawls 13, which are connected with the dog carrying rocker frame 14. The ribbon is fed when the rocker frame is operated. The ribbon passes through the ribbon guide or holder 15. The ribbon guide is pivoted to an arm, and at its lower end is connected by a connecting wire with the rocker frame 14. When a type key is depressed the rocker

frame is rocked and the ribbon guide with the ribbon vibrated to the printing center; and when the key is released the ribbon guide and ribbon are vibrated away from the platen again out of the line of vision of the operator, as is clearly shown by the arrows in Figs. 1 and 2, as is shown in Fig. 5. In Fig. 5 the ribbon is shown in normal place below the line of writing.

The type bars are connected with the key levers 17 and are operated when the key levers are depressed. Owing to their positions in the type ring they cannot be connected to the key levers in the ordinary manner by simple connecting wires. The method by which I connect them is as follows: I attach a connecting wire 18 to each type bar in the usual manner. These connecting wires extend in a direction substantially parallel with the direction of the type bars when at rest. At their front ends they are attached to bell crank levers 19. To the other ends of the bell crank levers are attached a second set of connecting wires 20; and these latter wires are extended downwardly and connected with the key levers, in the usual manner. I have also provided means for keeping the space in front of the printing center on the platen clear of connecting wires so as not to obstruct the view of the writing. In order to accomplish this I have substituted rock shafts 21, (see Fig. 9) in place of the bell crank levers. By attaching the connecting wire 18 to the end of the rock shaft directly above the line of vision and the connecting wire 20 to the other end of the rock shaft I remove the connecting wire 20 out of the line of vision between the operator and the platen. For this purpose the other connecting wire 20 and the wire 22 should be omitted.

In the type bar plate I have arranged two sets of type bars, one set being longer than the other. This is the well known method of setting the type bars in the plate which is adopted in order to secure greater length for the pivots than would be possible if they were all of equal length and pivoted in a single circle. Each of the type bars carries a type head with two type characters, and part of the type bars have type heads with three characters each. The type heads on the bars directly above and below the printing center are in line with their bars. But as the bars are arranged on the sides of the rings as well as above and below the printing center the type heads are placed on the bars more and more obliquely until on the extreme sides of the rings they are placed on the bars at right angles. In rapid work the type heads are liable to collide when being returned to their normal positions with adjoining types which are being moved to the printing center. To avoid this danger I have made double bends on the long set of type bars near their type heads for clearance with the short type bars. The type heads which are set obliquely on their bars on the short bars fit nicely into the double bends on the long bars, because the end of the type head on one side of the long bar is lower down on the bar than is the one on the other side of the long bar. Fig. 3 shows the arrangement of the bars on one side of the type bar plate, extending from the bar directly below the printing center around the side of the type bar plate and up to the bar directly above the printing center. The longer type bars are shown pivoted farther back than the shorter bars, and provided with the double bends near their type heads for clearance with the type heads on the shorter bars.

The arrangement of the type keys in the key board is that of the Remington standard typewriter, excepting that in the next to the top row of keys I have placed a row of double spacing keys which are connected with the type characters which are frequently terminal characters. The row of double spacing keys is distinguished from the remainder of the keys by being black with white letters, while the other keys are white with black letters. The row of double spacing keys includes the letters S E D R F T Y N O and a blank double spacing key (see Fig. 4). Their positions are especially advantageous in the key board, being directly back of and above the single spacing letter keys. In this position they are in full view of the operator and are not covered by his hands in operating, as are the lower rows. Hence he can readily pick them out in operating. I have found by practice that if the double spacing keys are placed in the body of the key board in the same rows with single spacing keys the operator will sometimes strike the double spacing key when he wishes to strike the single spacing key, and vice versa. By placing the double spacing keys in a row by themselves this danger is avoided. The row of figure keys is placed at the top of the key board back of the double spacing row of keys. This arrangement of the key board is adopted because the figure keys are very little used with the letter keys. Hence the double spacing row of letter keys is placed just back of the single spacing letter keys so that the operator will not have to move her hands unnecessarily in fingering, and the figure keys are placed by themselves as shown.

In my United States Patent No. 616,840, dated December 27, 1898, I have shown two keys independently connected with the same type bar, by slotted connections, so that either key could be depressed without depressing the other key, and one of the keys is connected with the single spacing mecha-

nism and the other key with the double spacing mechanism. In my present construction I show an improved form of connecting two keys with the same type bar, and one of the keys with the single spacing mechanism and the other key with the double spacing mechanism. This improvement consists in a third wire which is connected to the same type bar and to the spacing mechanism. Its object is to bring the force of the carriage main spring to bear on the type bar to start it back to normal position after the printing has taken place, as will be hereinafter fully described. The construction of this device is shown in Figs. 9 and 10, in which the two slotted connecting wires 20 20 are connected with the same type bar 23 through the rock shaft 21 and the connecting wire 18, and one wire 20, is connected with a single spacing key and the other 20, with a double spacing key; and there is a third wire 22, connected at one end to the type bar 23, through the rock shaft 21, and the wire 18, and connected at its other end with the spacing mechanism through the keyless lever 24.

The paper carriage is of the general form described and claimed in my United States application Sr. No. 511,685 filed May 18, 1894. The paper carriage 4, is mounted at its rear edge on the guide rail 3 and is fastened to the rail by grooves in the carriage and corresponding grooves in the guide rail, and bearing balls in the grooves. The carriage is free to travel on the rail on the bearing balls, from one end of the rail to the other, for letter spacing. At its front edge the carriage is provided with the roller 25 which rests and travels with the carriage on the front rail 26 (see Figs. 1 and 8). It can be lifted off from the front rail, and the carriage raised for inspection of the writing, etc., by taking hold of the front of the carriage and lifting it.

Fig. 1 shows the carriage in its normal position, and Fig. 2 shows it in its raised position. The arrows in Figs. 1 and 2 show the line of vision. When the carriage is raised the guide rail is revolved with the carriage, the two being held together and revolved together on their axes by the bearing balls 27. A sectional view of the bearing balls and their grooves is shown in Fig. 7. There are two bearing balls on the top of the guide rail, and one at the bottom of the rail intermediately between the two on the top of the rail. The front carriage rail is also pivoted concentrically with the guide rail 3 and the carriage 4. The front rail is supported by the arms 6 of the shifting frame. The carriage is shifted from its normal position in lower case to its shifted position in upper case by depressing the shifting frame 6 and the front rail 26. The carriage is also shifted to a third position for printing special characters, which are carried on certain of the type bars, by lifting the front rail. A detail of the mechanism for shifting the front rail and the carriage down to upper case and for lifting them to special case is shown in Fig. 8. The shift key 28 is connected with the shift frame 6 by means of the link 29. The carriage is held in its normal position against gravity by means of the spring 30 and the lever 31. The pin 32 prevents the spring 30 and the lever 31 from raising the shift frame higher than its normal position. When it is desired to lift the shifting frame and the carriage to their upper position the spring 33 and the lever 34 assist in overcoming the weight of the carriage. Hence the carriage can be easily lifted to shift it to special case. There is only one shift key for all three cases. By depressing the shift key the carriage is lowered to upper case, and by lifting the shift key the carriage is raised to special case, as shown in dotted lines in Fig. 8.

In machines heretofore invented with three types on a bar two shift keys have been provided, one for shifting to capital letters and one for shifting to figures and other characters. I accomplish the same results by the use of one key by depressing the key for one case and lifting it for the other case. As previously stated the carriage is held in its normal central position by the springs 30 and 33. When the carriage has been shifted it tends to return to its central normal position under the influence of the springs. In returning to the central position from either of the shifted positions the carriage acquires such momentum that it is in danger of being carried past the central position before coming to rest. If the next type key is struck rapidly while the carriage is coming to rest in central position after it has been carried by that position by its own momentum the letter will be printed out of place in the line owing to the fact that the carriage had not come to rest before the printing took place. In order to avoid this danger it is desirable to provide some means for bringing the carriage to rest at its central position before any printing can occur. I accomplish this object by aid of a spring actuated cam with beveled faces which engages the carriage when it arrives at its central position and prevents it from vibrating far beyond the central position, and brings it quickly to rest at its normal position. The device is clearly shown in Fig. 8. The beveled lips 35 and 36 on the checking lever 37, engage the upper and lower faces of the prong 38 on the extreme front of the shifting frame 6 when the carriage is in its central normal position. Near the lower end of the lever 37 is the arm 39 which projects forward and is pressed upward by the

spring 40. The spring pressure is transmitted through the arm 39 to the lever 37 and presses the beveled faces 35 and 36 against the prong 38. Hence the force of the spring 40 tends to hold the carriage in its central position, and tends to check it there when it is returned from its shifted position in either direction. When the carriage is rapidly returned to its central position, as it always is when the shift key is released rapidly, the lever 37 does not immediately arrest the carriage on its arrival at central position, but owing to the fact that the lips 35 and 36, and the corresponding faces on the prong 38 are beveled, the carriage is permitted to pass beyond the central position. The function of the spring 40 acting through the lever 37, is however, to assist the springs 30 and 33, and reinforce them at the central position, thus preventing the carriage from passing any great distance beyond normal position, and bringing it to rest much more quickly than would be the case if only the springs 30 and 33 were employed. The bevels on the lips 35 and 36 are so slight that the force exerted by the spring 40 on the arm 39, is multiplied at the points of engagement of the lever 37, with the prong 38. The lever 37 is also provided with two other beveled faces 41 and 42, which are engaged by the roller 43, the face 41 being engaged when the shift key 28 is depressed, and the face 42 being engaged, when the shift key is lifted. The beveling on the faces 41 and 42, is much greater than the beveling on the lips 35 and 36, and hence the spring 40, exerts less pressure on the shift key 28, than it does on the prong 38. Hence the shift key can be easily lifted and depressed, and at the same time enough pressure is exerted on the prong 38 to bring the carriage quickly to rest in central position. I have shown this feature applied to a shifting paper carriage, but it may be equally well applied to the various forms of shifting mechanism known. Thus it is applicable to machines in which the type bars are shifted for printing upper case and figures, the carriage remaining stationary. In Figs. 1 and 2 the lip 36, and the beveled face 41, are omitted. Therefore in the construction as shown in Figs. 1 and 2, there is no extra force applied to check the carriage on its return from special case, but only on its return from capital letter case. Otherwise the construction is the same as that shown in Fig. 8. In the form shown in Figs. 1 and 2 the force of the spring 40, is not opposed to the depression of the shift key 28 but only to lifting that key. Hence the shift key can be more easily depressed. As there are only a few type bars with three types on a bar, and as the third characters on these bars are special characters which are infrequently used, no provision is made in Figs. 1 and 2 for checking the carriage on its return from special case, and therefore the force needed to depress the shift key for capital letter case is reduced. In Fig. 8, on the other hand the carriage is checked by the spring 40, on its return from both directions.

The shift key 28, is connected with the shifting frame 6 by the connecting link 29 (see Fig. 8). At the lower end of the link 29 there is a slot, and on the shift key lever there is a pin 44 which works in the slot. This arrangement enables the roller 43 to disengage the lever 37 from its obstructive engagement with the prong 38, before the shifting of the carriage is begun.

In order to insure good alinement it is essential that the carriage be secured against any loose movement on the guide rail. This is effected by the grooves in the rail and the bearing balls 27 in the grooves. The two bearing balls on the top of the guide rail 3, rest in the groove in the top of the rail. Corresponding grooves are provided in the carriage frame 4, which rests on top of the two bearing balls. On the under side of the guide rail there is one bearing ball which rests in the groove in the bottom of the rail. Below the ball in the bottom groove is a grooved casing 45, which holds the ball in the groove in the bottom of the rail and prevents it from escaping out of the groove. The carriage frame 4, and the lower casing 45, and the bearing balls 27, and the guide rail 3, are all fastened together by the rack supporting clamps 46 46, which encircle the carriage frame and the casing 45. The rack clamps 46, can be adjusted by the adjusting screws 47 47, so as to take up any looseness of the carriage on the guide rail.

In order that the carriage may run easily and smoothly on the guide rail there must be no crowding of the bearing balls in their grooves, and on the other hand in order to insure good alinement of the print there must not be any looseness of the balls in their grooves. In order to provide against any imperfection in the grooves which might cause looseness of the balls in some places in the grooves and binding of the balls in other places, I have provided springs 48 48, whose function it is to take up any looseness of the balls in their grooves. The rack clamps 46 46, are adjusted sufficiently tight to insure that the bearing balls shall not escape out of their grooves. The springs 48 48, are fastened by screws onto two projections on the carriage frame 4, which extend down and under the guide rail (Fig. 7). The springs 48 48, extend under the casing 45, and pressing the casing upward as well as drawing the carriage frame 4 downward, push all three of the bearing balls 27, firmly into their grooves. The springs 48 48, are only

just strong enough to insure that there shall be no looseness of the carriage at the printing center and they do not exert pressure enough on the balls to cause detrimental friction in the grooves.

On the carriage, near each end of the platen, are two endless non-elastic feed bands 49 49, (Figs. 4 and 6) for holding the paper against the platen and for feeding it with the platen. These bands revolve on pulleys 50 and 51, and are tensioned against the platen by spring pressure applied to the pulleys. The arms 52 and 53, which respectively support the pulleys 50 and 51, are jointed by the pivot 54, and the spring 55, which is fastened at one end on the arm 52, and at the other end on the arm 53, pulls the two arms together, causing the front pulley to be raised until the band 49, is firmly pressed against the platen 8. A number of holes for securing the spring 55, are drilled in the arm 52, (three being shown in Fig. 6). These holes are for the purpose of regulating the tensions of the two bands 49 49, equally at the two ends of the platen, to insure perfect feed of the paper on the platen. If the tension of the feed band at one end of the platen is greater than that at the other end the paper is apt to feed faster at one end than at the other, and hence the adjustments are provided to accurately regulate the tensions.

On the right hand end of the platen there is a gear wheel 56, and on the right hand end of the feed roller there is a gear wheel 57. These two gear wheels respectively intermesh with the pinions 58 and 59, and the pinions mesh together. Hence any movement of the platen about its axis is transmitted through the gears and the pinions to the feed roller. The ratio of the gears and pinions to each other is such that the feed roller is caused to revolve at its periphery at exactly the same rate of speed that the platen does at its periphery. The two pinions are inserted between the gears 56 and 57, so that when a large quantity of paper is inserted on the platen the intermeshing of the teeth of the gears and the pinions will be preserved. This is accomplished by pivoting the pinion 59, immediately below the gear 57, in line with the pivot 54, of the arm 52, which carries the feed roller.

At the left hand end of the platen there is a ratchet wheel 60, with its teeth facing outwardly. Mounted on the left hand end of the carriage is a platen rotating lever 61, with its rock shaft 62, and ratchet pawl 63, (Figs. 1 2 4 and 5). This is a well known construction for rotating the platen. The platen can also be rotated by hand by the hand wheels 64 64.

The carriage is normally held in check by the engagement of the rack 5, with the front dog 65, on the rocker frame 14. A rack guide 66, holds the rack in its normal position (Fig. 12). The rack guide may be held in its normal position by any suitable force, as say a spring or gravity, and returned by such force to its normal position after it has been moved to disengage the rack from the dog 65. On the guide 66, is a strip 67, which is bent around so that it passes under the rack and engages it on each side. On the left hand end of the carriage is the carriage release key 68, which is pivoted to a shaft on the opposite end of which the hook 69 is fastened. The hook 69, engages the rack guide 66. By pushing the carriage release key 68 backward, the rack guide is swung forward, revolving the rack on its clamps 46, and so disengaging the rack from the dog 65. The carriage can then be moved to any desired position and upon the release of the key 68 the rack guide will return to its normal position, thus reëngaging the rack with the dog 65. The rear end of the strip 67, is bent forwardly and passes behind the rear dog 70, at some distance from that dog, so that the dog 70 has plenty of room for reciprocating on its axis. The strip 67 terminates in the tip 71, (Fig. 11). This tip is normally just in the rear of the path in which the dog 65 reciprocates. But when the rack guide is swung forward to release the rack from the dog 65, the tip 71 is brought forward into the path of the dog 65, immediately back of the single spacing face 72 on the dog. The dog 65 is thus prevented from spacing backward when out of engagement with the rack, and therefore when the carriage has been brought into the desired position and the key 68, released the carriage will remain in the position in which it is released instead of being spaced forward as would be the case if the dog 65 had been left free to space backward when out of engagement with the rack. Fig. 12 shows the key 68 pushed back, the rack released, and the tip 71 back of the dog 65.

The escapement may be of any approved type, and it is not necessary for the purposes of this case, to indicate the character thereof, other than as I have already done.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a typewriting machine, the combination of a carriage, a platen carried thereby, a series of type-bars each bearing a plurality of characters, a carriage guide rail, a carriage shifting rail, both the carriage and the carriage shifting rail being mounted to turn about the axis of the carriage guide rail, and means for manually moving the platen to an observation position at any time, substantially as described.

2. In a typewriting machine provided with a platen shiftable to upper case and

lower case printing positions, the combination of a carriage for the platen, a carriage guide rail, spacing mechanism whereby the carriage is fed on the rail lengthwise thereof, a shift key and means for thereby rotating the carriage about the axis of the rail to shift the platen from one printing position to the other, and means for rotating the carriage about the axis of the rail independently of the shift key, substantially as described.

3. In a typewriting machine provided with a platen shiftable to upper case and lower case printing positions, the combination of a carriage for the platen, a carriage guide rail, means for supporting the carriage upon the rail and for fastening it thereon, spacing mechanism whereby the carriage is fed on the rail lengthwise thereof, a shift key and means for thereby rotating the carriage about the axis of the rail to shift the platen from one printing position to the other, and means for rotating the carriage about the axis of the rail independently of the shift key, substantially as described.

4. In a typewriting machine provided with a platen shiftable to upper case and lower case printing positions, the combination of a carriage for the platen, a carriage guide rail, grooves in the carriage and corresponding grooves in the rail and bearing balls in the grooves whereby the carriage is supported upon the rail and fastened thereon, spacing mechanism whereby the carriage is fed on the rail lengthwise thereof, a shift key and means for thereby rotating the carriage about the axis of the rail to shift the platen from one printing position to the other, and means for rotating the carriage about the axis of the rail independently of the shift key, substantially as described.

5. In a typewriting machine wherein the same keys operate both lower case letters and upper case letters for printing, the combination of a carriage, a carriage guide rail, carriage spacing mechanism comprising carriage propelling power and a toothed member mounted on the carriage and controlled by escapement dogs whereby the carriage is fed on the rail lengthwise thereof, a shift key and means for thereby rotating the carriage from lower case to upper case printing position about the axis of the rail, and a guide for holding the said toothed member in its carriage controlling engagement when the carriage is shifted from lower case to upper case, substantially as described.

6. In a typewriting machine wherein the same keys operate both lower case letters and upper case letters for printing, the combination of a carriage, a carriage guide rail, means for supporting the carriage upon the rail and fastening it to the rail, spacing mechanism comprising carriage propelling power and two engaging escapement members whereby the carriage is fed on the rail lengthwise thereof, a shift key and means for thereby rotating the carriage from lower case to upper case printing position about the axis of the rail, and a guide for holding the two said members in the spacing mechanism in engagement when the carriage is so shifted, substantially as described.

7. In a typewriting machine wherein the same keys operate both lower case letters and upper case letters for printing, the combination of a carriage, a carriage guide rail, grooves in the carriage and corresponding grooves in the rail and bearing balls in the grooves whereby the carriage is supported on the rail and fastened to the rail, spacing mechanism comprising carriage propelling power and two engaging escapement members whereby the carriage is fed on the rail lengthwise thereof, a shift key and means for thereby rotating the carriage from lower case to upper case printing position about the axis of the rail, and a guide for holding the two said members in the spacing mechanism in engagement when the carriage is so shifted, substantially as described.

8. In a typewriting machine, the combination with the escapement dogs of a platen carriage and a rack bar to control the carriage, both the carriage and the rack bar being movable endwise together and both hinged concentrically about a common guide rail, and a guide to hold the rack bar at its toothed edge in operative relation with the escapement dogs, substantially as described.

9. In a typewriting machine, the combination of a platen carriage and a rack bar movable endwise together and both hinged concentrically about a common guide rail, a guide which engages the rack bar at its toothed edge to control it in engagement with a dog, and a carriage release key for shifting said rack guide and for thereby disengaging the rack from the dog, substantially as described.

10. In a typewriting machine wherein the same keys operate for printing lower case letters, upper case letters and special case characters, all under control of the same shift key, the combination of a shifting carriage, the shift key therefor, means connected with the key for shifting the carriage from lower case to upper case when the shift key is depressed and for shifting from lower case to special case when the shift key is lifted, a stop for checking the carriage when it is returned from upper case to lower case, and means connected with the key for engaging the stop and removing it from its obstructive position when the shift key is lifted, substantially as described.

11. In a typewriting machine, the combination of a shifting carriage, shifting mechanism for holding the carriage normally in a central position and for causing it to move in both directions from its central position, a key for shifting the carriage out of its central position, spring mechanism for returning the carriage to its central position, stop mechanism including a spring actuated beveled face for checking the carriage on its return to central position, and a beveled face on the stop mechanism which is actuated by the said key for removing the stop mechanism from its obstructive position, the two said faces on the stop mechanism being beveled at different angles from one another whereby the carriage checking spring is applied with greater force at its point of application for checking the carriage than it is applied to the shift key, substantially as described.

12. In a front strike typewriter, the combination of the type bars, each bearing a plurality of type characters, the platen, a key, spring operated means for maintaining the platen normally at a printing level in which the lower case characters on the type bars register with the platen for printing, means operated by the key for moving the platen to another level in which the upper case characters register with the platen for printing, means operated by the key for moving the platen to a level higher than both said printing levels, and a spring mechanism tending to move the platen to the last mentioned level, substantially as described.

13. In a front strike typewriter, the combination of the carriage and the platen thereon adapted to assume a plurality of printing positions at different levels, and spring mechanism arranged and adapted to automatically lift the platen from one printing level to another and to assist in lifting it to a level above both said printing levels, substantially as described.

14. In a front strike typewriter, the combination of the carriage and the platen thereon adapted to assume a plurality of printing positions at different levels, a spring mechanism comprising two springs arranged and adapted to automatically lift the platen from its lowest printing position to a higher one, and means for putting one spring out of action at the last mentioned position and for permitting the other spring to assist in lifting the platen to a still higher level, substantially as described.

15. In a visible writing typewriting machine, the combination of a main frame, a laterally movable platen supporting carriage, and a supplemental frame which entirely supports the carriage and is pivoted to the main frame.

16. In a visible writing typewriting machine, the combination of a main frame, a laterally-movable platen carriage, and a shift frame for the carriage pivoted to the main frame, the pivotal axes of the shift frame and platen and the impact point at the platen being all substantially in the same plane.

17. In a visible writing typewriter, the combination of a platen carriage, a supporting frame therefor, comprising a race bar with two race-ways, two opposing race-ways in the carriage, and interposed rolling devices in said race-ways, the axial lines of the race bar and platen, and the impact point at the front of the platen, being all arranged in one plane, and said race-ways and interposed rolling devices arranged in another plane, substantially perpendicular thereto.

18. In a front strike typewriter, the combination with the main frame and carriage, of a supplemental carriage supporting frame pivoted to the main frame, a race bar with two race-ways in the supplemental frame, two opposing race-ways in the carriage, interposed rolling devices in the race-ways, and key-actuated means for oscillating the supplemental frame to move the carriage to a plurality of printing positions at different levels.

19. In a front strike typewriter, the combination with the main frame and carriage, of a supplemental carriage supporting frame pivoted to the main frame, a race bar with two race-ways in the supplemental frame, two opposing race-ways in the carriage, interposed rolling devices in the race-ways, said race-ways and rolling devices being all arranged in substantially the same plane, and key-actuated means for oscillating the supplemental frame to move the carriage to a plurality of printing positions at different levels.

20. In a front strike typewriter, the combination with the main frame and carriage, of a supplemental carriage supporting frame pivoted to the main frame and comprising a race bar with race ways and a front rail, all adapted to be oscillated with the carriage to two printing positions, an opposible race-way in the carriage of substantially the same length as that in the race bar, interposed rolling devices, and key-actuated means to oscillate said supplemental frame and the carriage thereon.

21. In a visible writing machine, the combination with the main frame, of a carriage having a race-way, a supplemental carriage supporting frame having an opposible race-way and pivoted to the main frame to place the carriage in two printing positions, interposed rolling devices in said race-ways, and key-actuated means for oscillating the rolling devices with the carriage and supple-

mental frame to move the carriage from one printing position to the other.

22. In a front strike typewriter, the combination with the main frame and carriage, of a supplemental frame pivoted to the main frame and which entirely supports the carriage, opposing guide parts on the carriage and frame and interposed rolling devices, and a shift-key to oscillate the carriage from one printing position to another.

23. In a visible-writing typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a main frame, a laterally-movable platen-carriage, and a supplemental frame which entirely supports the carriage and is pivoted to the main frame to swing up and down to place the platen in different printing positions, said supplemental frame being connected to the main frame by pivots located in rear of the platen and parallel therewith, substantially as described.

24. In a visible writing machine, the combination of a carriage comprising race ways, a pivoted race bar whereon the carriage runs, race ways in the race bar, interposed rolling devices in the race ways between the carriage and race bar, and means, including a shift key, for simultaneously shifting the race bar with the carriage, by aid of the race ways and interposed rolling devices, to enable different types to print.

25. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, an oscillatory support whereon said carriage runs, means for oscillating said support to enable different types to print, two race ways in the carriage, two corresponding race ways in the support, rolling devices in the race ways, and means for oscillating one pair of race ways in one direction and the other pair in the opposite direction when the support and carriage are oscillated.

26. In a front strike typewriter, the combination with a platen carriage, a shift frame moving the carriage to two printing positions and comprising a race bar with two race ways, two opposing race ways in the carriage, and two sets of interposed rolling devices in said race ways, of means for moving one set of said rolling devices in one direction and the other set in the opposite direction when the carriage is shifted from one printing position to the other.

FREDERIC W. HILLARD.

Witnesses:
THOMAS EWING, Jr.,
H'Y H. WHITMAN.