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CARRIAGE CONTROL FOR TYPE WRITERS.

APPLICATION FILED FEB. 3, 1917.

1,241,865.

Patented Oct. 2, 1917.

3 SHEETS—SHEET 1.

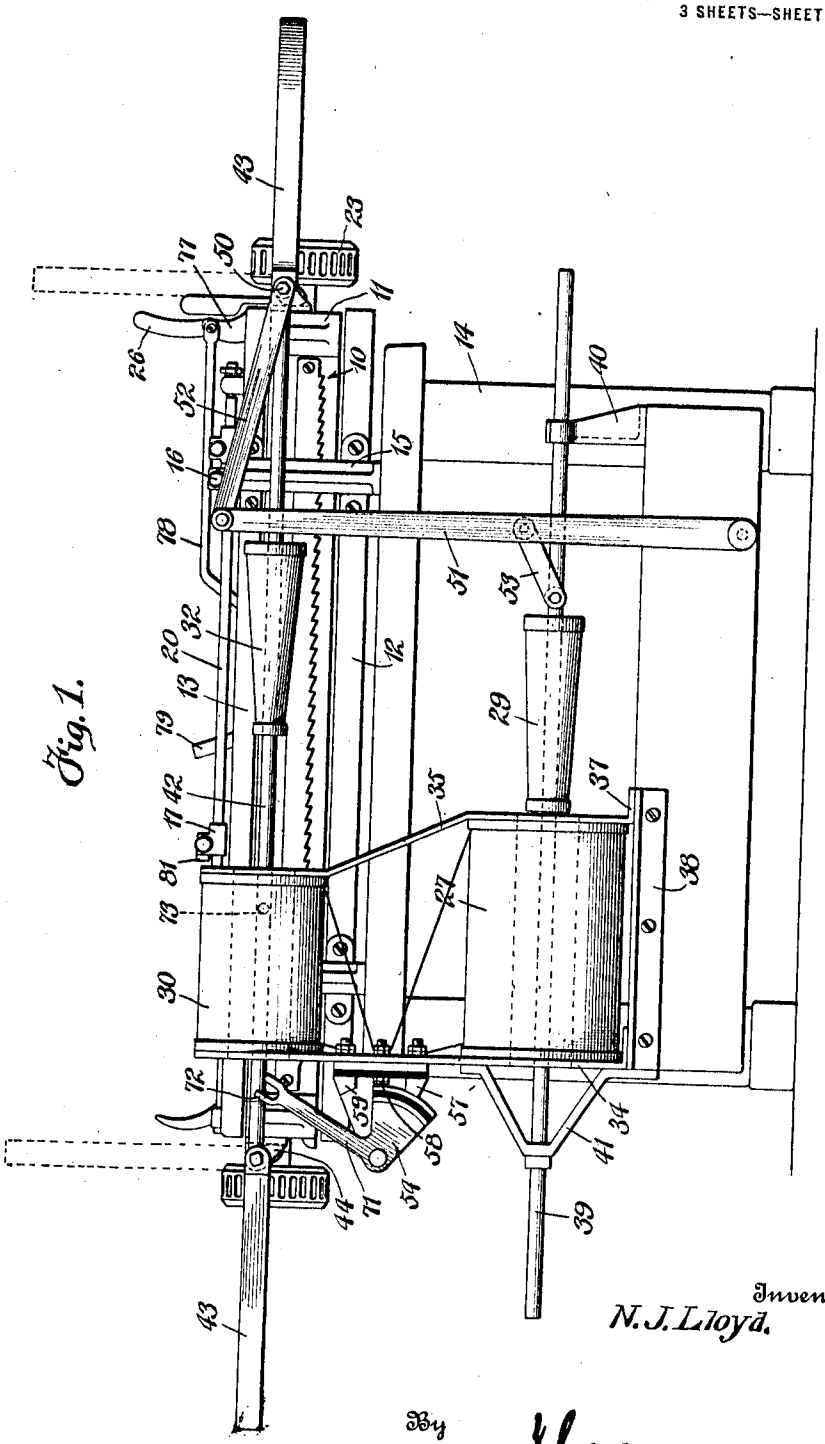


Fig. 1.

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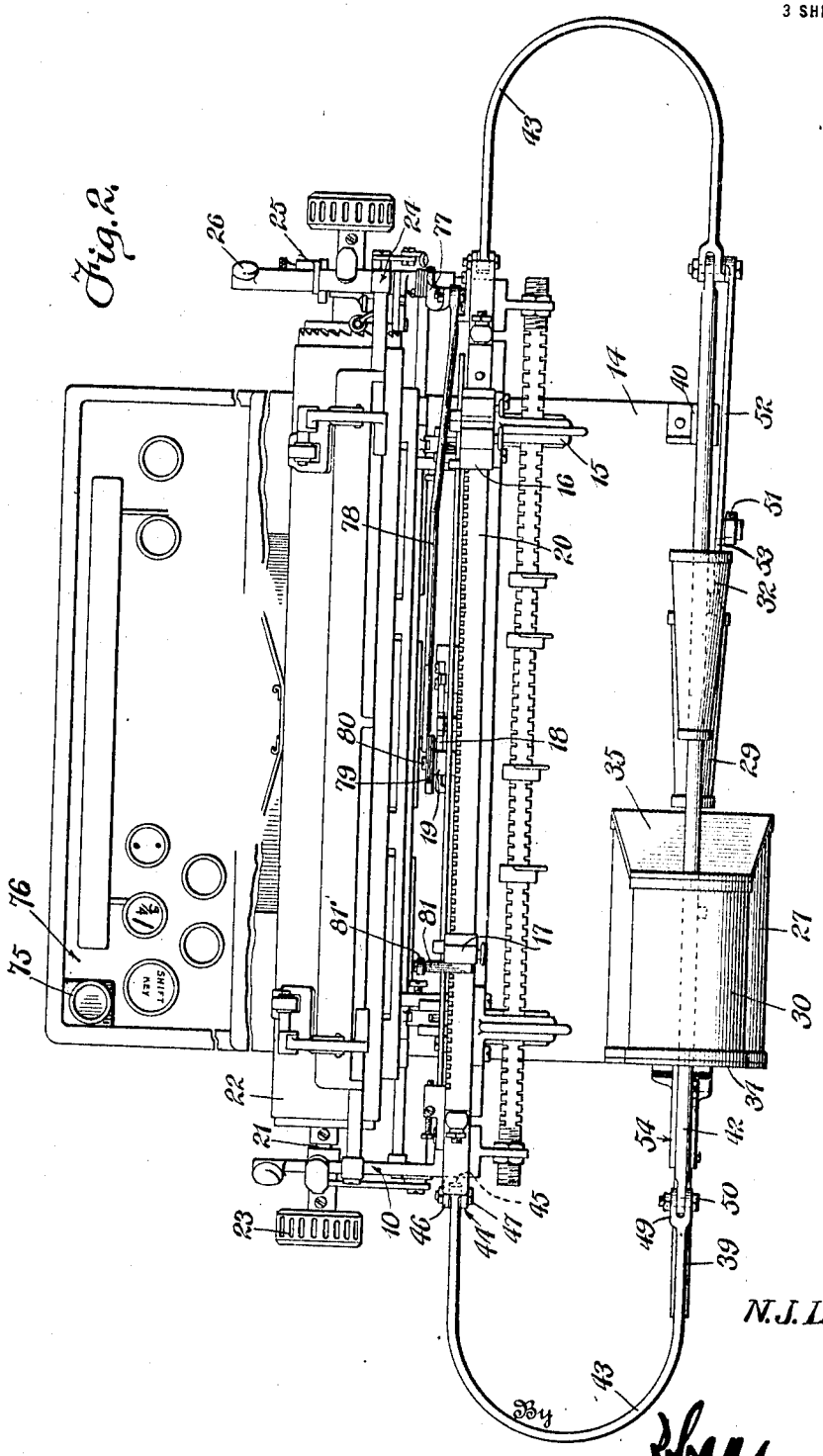
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3 SHEETS—SHEET 2.

Fig. 2.



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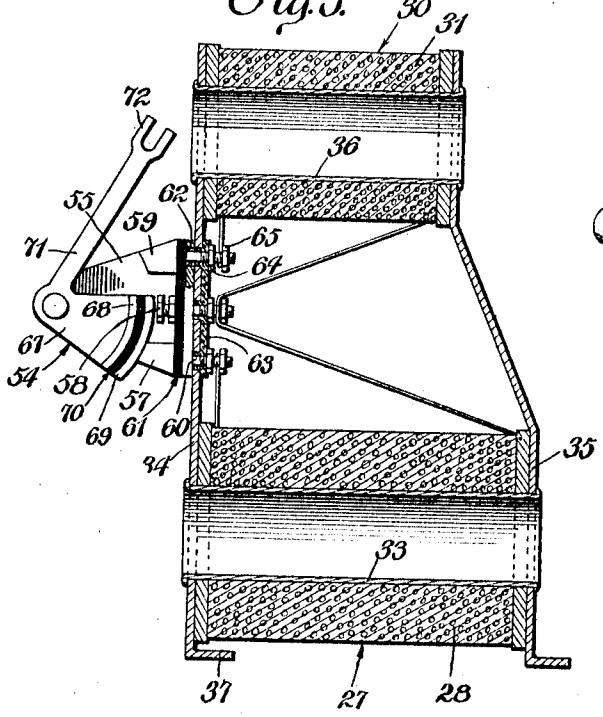
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3 SHEETS—SHEET 3.

Fig. 3.



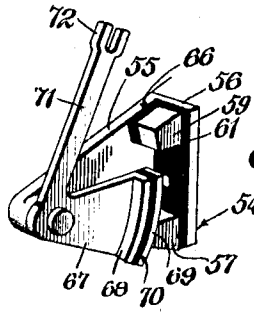


Fig. 4.

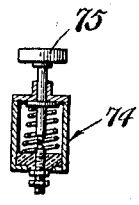


Fig. 7.

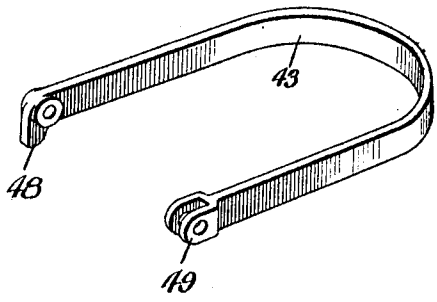


Fig. 5.

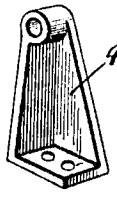


Fig. 6.

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UNITED STATES PATENT OFFICE.

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CARRIAGE CONTROL FOR TYPE-WRITERS.

1,241,865. Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed February 3, 1917. Serial No. 146,432.

To all whom it may concern:

Be it known that I, NAFEW J. LLOYD, a citizen of the United States, residing at Butte, in the county of Silver Bow and State of Montana, have invented certain new and useful Improvements in Carriage Controls for Type-Writers, of which the following is a specification.

My invention relates to new and useful improvements in typewriters and more particularly to mechanism for controlling and actuating the carriage and platen of the typewriter, the primary object of my invention consisting in the provision of electrical means for returning the carriage to initial position after a line has been written and for turning the platen for the commencement of a new line of writing.

In this connection, one object of my invention resides in the provision of a pair of successively operating solenoids having plungers operatively connected to the carriage so that energization of the solenoids will cause a return movement of the carriage at any time circuits are closed through the solenoids.

A still further object of my invention is to provide for a quick and certain return of the carriage, irrespective of the length of the carriage and irrespective of its location at the time its return is desired. It is to accomplish this object that I employ a pair of solenoids, instead of a single solenoid in order that the solenoids need not be as large as would otherwise be necessary to insure the proper length of movement of the carriage and in order that one or the other of the solenoid plungers shall at all times be at a point where it will be strongly affected by its winding to thereby insure rapidity of action.

Another object of my invention resides in the provision of an automatic switch for causing successive energization and deënergization of the windings of the solenoids to insure their proper step by step action and prevent any possibility of one solenoid acting against the other.

A still further object of my invention resides in so arranging the platen turning mechanism that it operates automatically upon the return of the carriage whether the carriage is returned manually or by the solenoids and in so arranging both the carriage return mechanism and platen turning mechanism that the return of the carriage or turning of the platen may be accomplished manually in any one of the numerous ways usually provided.

With these and other objects in view, my invention will be more fully described, illustrated in the accompanying drawings, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawings:

Figure 1 is a rear elevation of a conventional form of typewriter with my invention applied thereto;

Fig. 2 is a fragmentary plan view of the mechanism illustrated in Fig. 1;

Fig. 3 is a vertical sectional view illustrating the construction of the solenoids, their supporting brackets and the location of the automatic switch;

Fig. 4 is a perspective view of the switch itself;

Fig. 5 is a perspective view of one of the yokes employed in connecting the plunger of one solenoid with the typewriter carriage;

Fig. 6 is a perspective view of a bracket employed as a bearing for the plunger of the other solenoid.

Fig. 7 is a sectional view of the key switch employed.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In order to more clearly disclose the construction, application and operation of my carriage return mechanism and platen turning mechanism, I have illustrated my invention in connection with a standard Monarch typewriter, only such parts of the typewriter structure being shown or described as are essential to a clear understanding of my invention.

In the drawings, I illustrate a reciprocally mounted carriage 10 including the back bar 11 which reciprocates between upper and lower carriage race rails 12 and 13 which are adjustably secured to each other and to the frame 14 of the typewriter by the carriage race rail standards 15. The movement of the carriage in one direction is controlled by a left marginal stop 16 and in the other direction by a right marginal stop 17 through engagement of such stops with the usual stop lever 18 which, upon engaging the left marginal stop, is swung into

engagement with the stop stud 19 carried by the frame of the typewriter. The marginal stops are adjustably locked upon the marginal rail 20 and may, therefore, be readily adjusted to provide margins of any desired width both at the right and left of the paper employed in the typewriter. All of these parts are of the usual construction and their operation is, therefore, well understood and need not be explained at length.

This carriage journals the shaft 21 of the usual rubber covered platen roll 22 and mounted on the ends of the shaft are the usual platen thumb twirlers 23 by means of which the platen may be manually turned while the carriage remains stationary. The usual line space mechanism 24 and line space gage mechanism 25 are provided so that when the carriage is moved to the right by pressure exerted against the line space handle 26, the platen will be turned through one or more line spaces according to the setting of the gage. My present invention resides in the provision of electrically actuated means for moving the carriage to the right to the full extent permitted by the right marginal stop at any time desired and for automatically turning the platen through one or more spaces, according to the setting of the line space gage upon such movement of the carriage.

My improved carriage return mechanism includes a main solenoid 27 including the solenoid winding 28 and plunger 29 and a supplemental solenoid 30 including the winding 31 and plunger 32. The ends of the tubular portion 33 of the spool of the solenoid 27 are preferably extended beyond the heads of the spool and passed through supporting plates 34 and 35 and flanged outwardly against such plates to secure the coil between them. In like manner, the tubular portion 36 of the spool of the solenoid 30 has its ends extended and passed through the upper portions of the plates 34 and 35 and secured in the same manner. The solenoid 27 is preferably larger than the solenoid 30 and the plate 35 is bent so that the left hand ends of the two solenoids, looking at them from the rear of the typewriter, will be in vertical alinement with each other and so that the central portion of the upper solenoid 30 will be at the left of the lower solenoid 27. The lower ends of the supporting plates 34 and 35 are formed with feet 37 for attachment to a supporting bracket 38 secured to the lower rear portion of the frame 14 of the typewriter and at the left of the typewriter, looking at it from the rear.

The plunger 29 of the solenoid 27 is fixed to a rod of brass or other non-magnetic metal 39, one end of which is reciprocally mounted in a bearing bracket 40 mounted at the right of the typewriter frame and best shown in detail in Fig. 6 and the other end of which is journaled for reciprocation in a bracket 41 secured to the plate 34. These bearing brackets are so arranged that the rod and plunger carried by it are free to move axially of the solenoid winding 28, as clearly shown in Fig. 1. The plunger 32 of the solenoid 30 is similarly fixed upon a brass rod 42, the ends of which are connected by yokes 43 with brackets 44 secured to the opposite ends of the back bar 11 of the carriage. Each of the brackets 44 includes a body portion 45, which is secured to the end of the back bar, and outwardly projecting spaced ears 46, between which one end of the adjacent yoke is pivoted by a pivot bolt 47. Each yoke is substantially U-shaped and that end of each yoke pivoted to a bracket 44 is provided with a depending stop finger 48 which prevents downward swinging of the yoke below a horizontal plane, but which does not in any way interfere with the upward swinging of the yoke to a vertical or even an inclined position, as shown in dotted lines in Fig. 1. The opposite end of each yoke is provided with spaced ears 49 to receive eyes formed upon the end of the rod 42 in order that the yokes may be pivotally connected to the ends of the rod 42 by pivot bolts 50. By this means, the plunger 32 and its rod 42 are supported for reciprocation axially of the winding of the solenoid 30 and do not in any way interfere with the full movement of the carriage in either direction as in either extreme position of the carriage one arm of one or the other of the yokes will extend on one side of a race rail standard 11 and the other upon the other side. Obviously, when the yokes are in horizontal position, which is their operating position, they project considerably beyond the ends of the carriage and it is for this reason that I have pivotally connected them to the carriage and rod 42 so that when the typewriter is not in use they may be swung to the position shown in dotted lines in Fig. 1 in order that the typewriter may occupy less space.

A lever 51 is pivoted at its lower end to the lower portion of the frame of the typewriter at that side opposite the solenoids and at its upper end projects somewhat above the rod 42. Its upper end is pivotally connected by a link 52 to the rod 42 and adjacent yoke 43, the pivot bolt 50 connecting such yoke with the rod also serving as a connection for the link 52. A link 53 also connects an intermediate portion of the lever with the rod 39 adjacent that end of the plunger 29 more remote from the solenoid 27. This lever and the links are so proportioned as to permit free reciprocation of the carriage in the usual manner, the rods 39 and 42 and plungers carried by them reciprocating as the carriage moves and the

lever 51 and connecting links moving in unison.

Obviously, if the carriage is at its extreme right hand position, looking at it from the rear, which is the position occupied when a line has been finished, energization of the solenoid 27 will attract its plunger 29 and operate through the link 53, lever 51 and link 52 to move the carriage toward the left until the plunger 29 is centered in its solenoid 27. At this time, the plunger 32 will have closely approached its solenoid 30 so that if the solenoid 27 is now deënergized and the solenoid 30 energized, the movement of the carriage will be continued, due to the drawing of the plunger 32 into its solenoid. This plunger is so mounted upon the rod 42 that when it reaches the center of the solenoid 30, the carriage will have reached its extreme left hand, viewed from the rear, position.

To provide automatically for the proper successive energization and deënergization of these solenoids, I furnish a switch 54, best shown in Figs. 3 and 4 of the drawings. This switch includes a supporting body 55 having a flange 56 which engages against the outer face of the plate 34 between the solenoids. Contacts 57, 58 and 59 have threaded shank portions 60 which are passed through a block of insulation 61 mounted against the outer face of the flange 56, through insulating sleeves 62 projecting through the flange and through the plate 34 and through a block of insulation 63 mounted against the inner face of the plate 34. Nuts 64, threaded upon these shanks, secure both the bracket or body 55 of the switch to the plate 34 and the contacts to the switch body. Additional nuts 65 coöperate with the nuts 64 and contact shanks to provide binding posts, one terminal of the solenoid 27 being connected to the binding post of the contact 57, the corresponding terminal of the solenoid 30 to the binding post of the contact 59, and the other terminals of both solenoids to the binding post of the contact 58. Preferably, the block of insulation 61 is provided with extensions 66 which project between the contacts and the body of the bracket to completely insure proper insulation of the contacts from each other. A segmental shaped switch blade 67 is pivoted to the body 55 of the switch and along its arcuate edge has a lateral flange 68 which carries a contact strip 69 insulated from the flange by a block of insulation 70. The ends of the contacts 57 and 59 are shaped to be engaged by this contact strip 69, while the contact 58 is so constructed as to form a binding post and does not project sufficiently to be engaged by the strip 69. A lever arm 71, formed integrally with the sector 67, has a forked terminal 72 which projects at one side of the rod 42 and projecting from the rod 42 is a pin 73 adapted to engage within the fork of the lever arm to swing the lever during reciprocation of the rod. This pin is so located that when the rods 39 and 42 are moving, due to energization of the solenoids, the pin 73 will engage the lever arm to swing it and move the contact strip 69 into simultaneous engagement with the contacts 57 and 59 just prior to the centering of the plunger 29 in the solenoid 27 so that when the plunger is centered in the solenoid 27, the lever will have been swung out of engagement with the contact 57 while still remaining in engagement with the contact 59. As one wire of the energizing circuit is connected with the binding post 58 and the other to the contact strip 69, it will therefore be seen that when the contact 69 is in engagement with the contact 57 the solenoid will be energized, while when the contact 69 is in engagement with the contact 59, the solenoid 30 will be energized, both solenoids, of course, being energized when the contact strip 69 bridges the contacts 57 and 59.

A switch 74, of any suitable type, such as that best shown in Fig. 7, is provided for controlling the circuit to the automatic switch and solenoids and is preferably mounted so that its finger piece 75 is disposed at some convenient part of the keyboard 76 of the typewriter.

In addition to the above described mechanism, I provide means for automatically turning the platen upon the return of the carriage. This platen turning mechanism is fully described and illustrated in a copending application filed by me Feb. 3, 1917, and bearing the Serial No. 146,433 and need not, therefore, be explained at length in this application. This mechanism, as will be best seen by reference to Figs. 1 and 2 of the drawings, includes a lever arm 77 which is fixed to the shaft of the line space mechanism 24 and which, at its free end, is pivotally connected to a link 78 which in turn is pivotally connected to the lower end of a platen turning lever 79 which is pivoted upon a screw 80 threaded into the stop stud 19. The right marginal stop 17 carries a roller 81′ mounted upon an abutment 81 against which the upper end of the lever will engage just prior to the complete return of the carriage so that as the carriage finishes its return movement, the lever 79 will be swung to act through the link 78 to swing the lever 77 and, consequently, actuate the line space mechanism 24 to turn the platen to whatever extent is desired, dependent upon the setting of the line space gage mechanism 25.

From the foregoing description, taken in connection with the drawings, the general operation of my invention will be readily understood and but slight description is nec-

essary. Assuming that a line of writing has been completed, the operator of the typewriter may return the carriage and advance the platen one or more spaces, depending upon the setting of the line space gage, by merely holding the switch key 75 in depressed position. The closing of the switch 74, by depressing this switch key 75, will close a circuit from any suitable source of energy, through the solenoid 27, the automatic switch being at that time in the position shown in Fig. 1 so that current may pass the binding post of the contact 58 through the winding of the solenoid 27 to the contact 57 and contact strip 69 back to the switch key. This energization of the solenoid 27 will attract the plunger 29 and, consequently, act through the lever 51 to start the carriage upon its return movement. Just before the plunger 29 reaches the center of the solenoid 27, the pin 73 will engage the automatic switch lever 71 to bring the contact 69 into engagement with both of the contacts 57 and 59 so that both solenoids will momentarily work together to continue the movement of the carriage. By the time the plunger 29 is centered in its solenoid, the switch lever will be further turned to break the circuit to the solenoid 27 while still keeping the circuit to the solenoid 30 closed. The plunger 32 of the solenoid 30 has, by this time, come into the field of attraction of the solenoid and will, therefore, be drawn into it to complete the further movement of the carriage. As the carriage reaches the limit of its movement, the amount of such movement being governed by the marginal stop 17, the lever 79 will engage the abutment 81 to turn the shaft of the line space mechanism and so turn the platen. When this operation is completed, the key 75 is released to open the circuit and the operator may proceed with the writing. During the movement of the typewriter carriage, while writing the following line, the pin 73 will again engage the arm of the automatic switch so that when the line is completed, the switch will have been returned to its normal position shown in Fig. 1. Obviously, however, one or the other of the plungers of the solenoids is always in position to be attracted by its solenoid and the automatic switch is always in position to close a circuit through such solenoid or, if both solenoids are in position to be acted, through both solenoids. Therefore, the electric return of the carriage may be assured whether an entire line has been written or only a few words on a line.

As a matter of fact, it is important that both solenoids operate together for a brief interval prior to the complete return of the carriage in order that the carriage may gain additional impetus to effectively and quickly operate the platen turning mechanism. Of course, if the carriage of the typewriter is relatively short, a single large solenoid having a longer plunger may be employed in place of the two illustrated and described. For ordinary typewriters, however, I strongly recommend the employment of two solenoids in conjunction with each other.

It should be noted that numerous typewriters do not employ carriage race rail standards, such as shown at 11, and unless such standards are employed the use of the yokes 43 is unnecessary as bracket arms may be run readily from the carriage directly to the ends of the plunger rod 42 if there is no typewriter structure to obstruct their passage during movement of the carriage. For these reasons, I reserve the right to make any changes which may fall within the scope of the appended claims without in the slightest degree departing from the spirit of my invention. Attention should also be paid to the fact that by providing frusto-conical plungers for the solenoids, the magnetic center is thrown to the right, looking at the machine from the rear, thereby giving the longer pull for the solenoids before their plungers are magnetically centered without affecting the strength of the initial pull. Plungers of this type, when employed in connection with my invention, are therefore far superior to the ordinary cylindrical plungers.

Having thus described the invention, what is claimed as new is:

1. In a typewriter, the combination with a reciprocally mounted carriage, of a rod supported by the carriage and in parallel spaced relation thereto, a plunger carried by the rod, and a solenoid through which the rod and plunger are movable whereby energization of the solenoid may move the carriage.

2. In a typewriter, the combination with a frame, and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, reciprocally mounted rods carrying the plungers, operative connection between one of the rods and the carriage whereby the two will reciprocate in unison, and operative connection between the rods.

3. In a typewriter, the combination with a frame, and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, reciprocally mounted rods carrying the plungers, operatve connection between one of the rods and the carriage whereby the two will reciprocate in unison, and operative connection between the rods, said latter connection being such that irrespective of the position of the carriage one or another of the plungers is in position to be attracted by its solenoid.

4. In a typewriter, the combination with

a frame, and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, reciprocally mounted rods carrying the plungers, operative connection between one of the rods and the carriage whereby the two will reciprocate in unison, and operative connection between the rods, said connection being such that the plungers will successively move into the field of attraction of their solenoids.

5. In a typewriter, the combination with a frame, and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, connecting means between one of the plungers and the carriage whereby the two will move in unison, connecting means between the other plunger and the first mentioned connecting means whereby the plungers will have a certain relative movement in common, a two-branch circuit, each branch including one of the solenoids, a manually operable switch controlling the circuit, and an automatic switch controlling the branches of the circuit.

6. In a typewriter, the combination with a frame, and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, connecting means between one of the plungers and the carriage whereby the two will move in unison, connecting means between the other plunger and the first mentioned connecting means whereby the plungers will have a certain relative movement in common, a two-branch circuit, each branch including one of the solenoids, a manually operable switch controlling the circuit, and an automatic switch controlling the branches of the circuit, said automatic switch being controlled by the first mentioned plunger in its movement and at all times acting to establish its circuit through one or the other of the solenoids, dependent upon the positions of their plungers.

7. In a typewriter, the combination with a frame, and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, connecting means between one of the plungers and the carriage whereby the two will move in unison, connecting means between the other plunger and the first mentioned connecting means whereby the plungers will have a certain relative movement in common, a two-branch circuit, each branch including one of the solenoids, a manually operable switch controlling the circuit, and an automatic switch controlling the branches of the circuit, said automatic switch being controlled by the first mentioned plunger in its movement and at all times acting to establish its circuit through one or the other of the solenoids, dependent upon the positions of their plungers, the switch being arranged to close the circuit through one solenoid, to subsequently close circuits through both solenoids when the plunger of the first solenoid approaches its position of greatest attraction and to then open the circuit to the first solenoid while keeping the circuit to the second solenoid closed.

8. In a typewriter, the combination with a reciprocally mounted carriage, and a platen rotatably supported thereon, of a pair of solenoids, plungers for the solenoids, and operative connections between the plungers and carriage whereby the solenoids may successively operate to produce an uninterrupted movement of the carriage.

9. In a typewriter, the combination with a reciprocally mounted carriage, and a platen rotatably supported thereon, of a pair of solenoids, plungers for the solenoids, operative connections between the plungers and carriage whereby the solenoids may successively operate to produce an uninterrupted movement of the carriage, and an automatic switch controlling the solenoids and operating to render both solenoids effective immediately prior to the last part of the movement of the carriage to increase the rate of such movement.

10. In a typewriter, the combination with a reciprocally mounted carriage, and a platen rotatably supported thereon, of a pair of solenoids, plungers for the solenoids, operative connections between the plungers and carriage whereby the solenoids may successively operate to produce an uninterrupted movement of the carriage, an automatic switch controlling the solenoids and operating to render both solenoids effective immediately prior to the last part of the movement of the carriage to increase the rate of such movement, and means for automatically turning the platen as the carriage reaches the limit of its movement.

11. In a typewriter the combination with a frame and reciprocally mounted carriage, of a solenoid supported by the frame and including a plunger, a rod extending through and carrying the plunger, and U-shaped members connected by one arm to opposite ends of the carriage and by their other arms to opposite ends of the rod.

12. In a typewriter the combination with a frame and reciprocally mounted carriage, of a solenoid supported by the frame and including a plunger, a rod extending through and carrying the plunger, and U-shaped members connected by one arm to opposite ends of the carriage and by their other arms to opposite ends of the rod, the connections between the members, rod and carriage being such that the members will normally lie horizontal but may be swung upwardly and inwardly toward each other.

13. In a typewriter, the combination with a frame and a carriage reciprocally mounted on the frame, of a pair of solenoids supported by the frame, plungers for the solenoids, connecting means between one of the plungers and the carriage, connecting means between the plungers, a two-branch controlling circuit, each branch including one of the solenoids, an automatic switch controlling the branches of the circuit, a forked lever for operating the switch, and an abutment carried by one of the plungers and engageable with the forked lever to control the switch.

In testimony whereof I affix my signature.

NAFEW J. LLOYD. [L. S.]