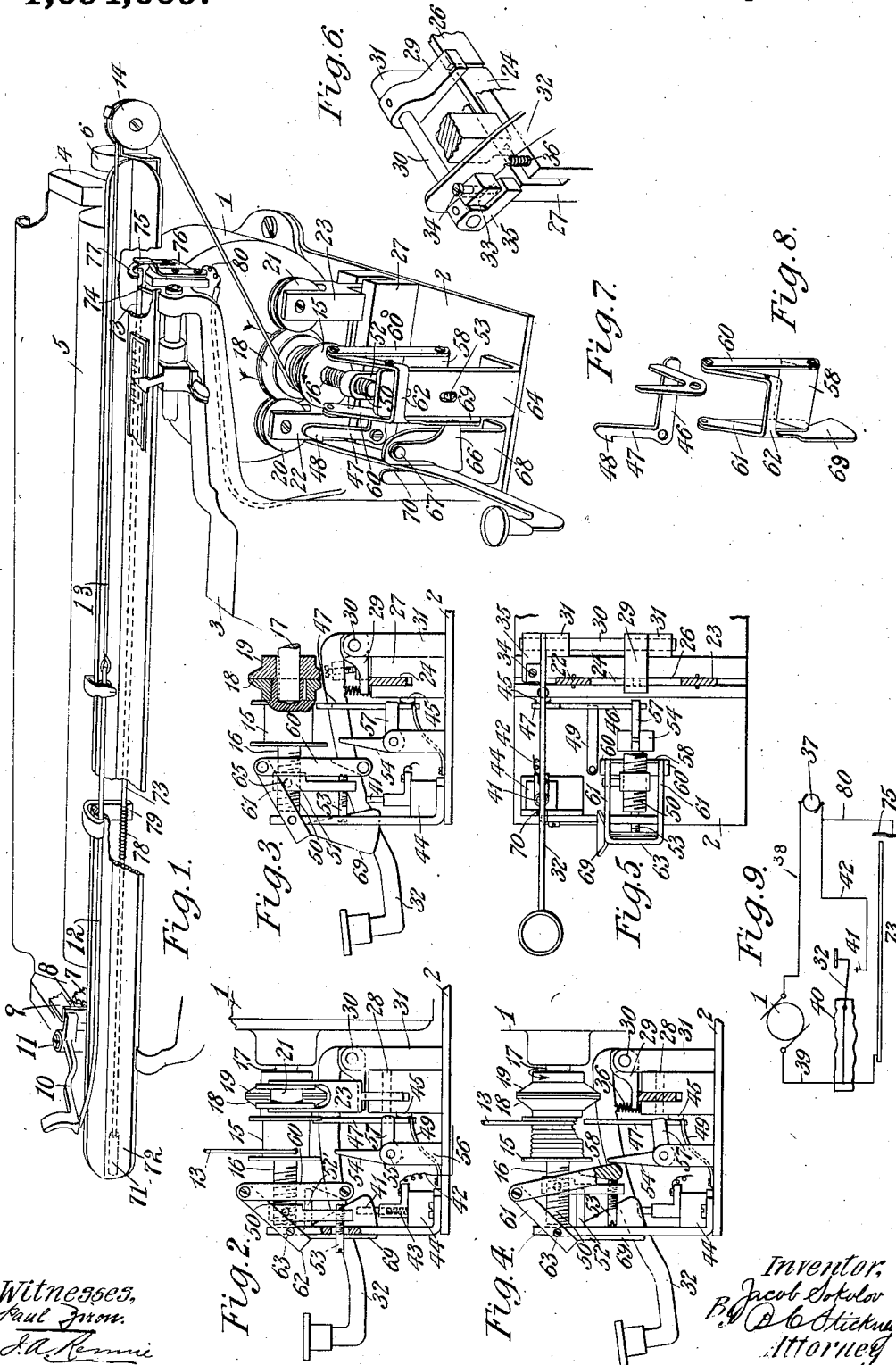


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TYPE WRITING MACHINE.
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1,094,609.

Patented Apr. 28, 1914.



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TYPE-WRITING MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JACOB SOKOLOV, a citizen of the United States, residing in the borough of Brooklyn, New York city, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The present invention relates to that class of typewriting machines in which the carriage return and line spacing operations are effected by power actuated means suitably controlled from the keyboard or elsewhere.

More particularly the invention relates to a carriage return mechanism by means of which the carriage may be returned, at high speed when the length of the line warrants such speed, and on other occasions at slow speed. In the present invention as in the invention disclosed in the patent to Benjamin F. Hutches, Jr., No. 1,062,009, dated May 20, 1913, the power is cut-off on the high speed return before the carriage actually reaches the stops at the starting point, and the return throw of the carriage, after the power cut-off, is completed by the momentum of the carriage itself. In mechanism of this character the power cut-off is arranged to take place in time to permit of a decrease of momentum before the stops are reached such that there can be no injury to the machine due to shocks in stopping the carriage. The longer the return movement, the greater the accrued carriage momentum, and the earlier should be the cut-off if shocks are to be avoided.

It is an object of the present invention to provide means for regulating the time of power cut-off, on carriage return, to the length of the line from which the return is made, so that regardless of variation in the length of the return movement, the momentum will always be sufficient to complete the carriage throw after the cut-off, but will never be excessive.

A further object of the invention is to provide means whereby the time of cut-off on return from each line is regulated according to the extent of letter feed or forward movement of the carriage in the writing of the line from which the return is to be made; or in other words, to provide means for utilizing the carriage in its forward movement as a means for setting an adjustable cut-off device; so that the greater

the forward movement or the longer the line, the earlier the cut-off, and vice versa.

It is a feature of the present invention that but one key is required to control three operations of the machine, to wit; to return the carriage at high speeds from long lines; to return the carriage at low speeds from short lines; and to line space without any return movement of the carriage. The function which the key actually performs, in any instance is determined, in the preferred form of the invention, by the extent to which the key is depressed.

It is a feature of the invention that the key serves as a switch to close the motor circuit, and that, when depressed or thrown for high speed return, it is locked in the position to which it is thrown until after the cut-off, whereupon it is automatically released.

The carriage may be returned and the platen rotated to line space by an electric motor connected through a friction clutch to a winding drum, on which is adapted to be wound a draw band connected at its opposite ends to the drum and line-spacing lever. The friction clutch may comprise members secured to the motor shaft and drum respectively, said members having abutting faces held in frictional contact with greater or less pressure by one or more pairs of spaced disks adapted to run in contact with inclined or conical outer surfaces of the clutch members. A finger key when depressed closes the circuit through the motor and also forces said disks against the clutch members to transmit a greater or less driving power through the clutch, depending upon the pressure of the key, whereby the return speed of the carriage is controlled.

The key when fully depressed is held in such position by a latch which is automatically released during the return travel of the carriage at a point varying with the distance through which the carriage has been returned. The latch may be released by a trip actuated by a member to which movement is imparted by the rotating drum, said member being preferably in the form of a nut threaded on the drum shaft and movable during the return travel of the carriage into position to actuate the trip and release the key. The point at which the trip is actuated is varied by means of a

cam or wedge interposed between the traveling nut and the trip, said wedge carried on a swinging frame also slowly moved by said nut during the forward run of the carriage, to interpose a portion of the wedge of greater or less thickness between the nut and said trip, depending on the length of the forward run of the carriage, and thus cause the power to be cut off earlier or later in the return travel of the carriage, depending on the distance through which the carriage has been moved in a forward direction. A cam actuated by the key lever may serve to frictionally hold the wedge in its adjusted position during the return movement of the carriage, said cam being automatically released when the key is returned.

Other objects and features of the invention will hereinafter appear.

In the accompanying drawings, Figure 1 is a view in perspective showing the motor control mechanism attached to a typewriter, with the motor connected to the carriage by a draw band. Fig. 2 is a view in side elevation of the motor control mechanism in normal position. Fig. 3 is a view similar to Fig. 2, the control key having been slightly depressed to return the carriage from short lines, or to line space, but not having been depressed to the locking position for returning the carriage from long lines. Fig. 4 is a view similar to Figs. 2 and 3 except that the key is shown fully depressed and locked for a long line return. Fig. 5 is a top plan of the motor controlling mechanism. Fig. 6 is a detail perspective view of the key lever connections to the friction rolls. Fig. 7 is a detail view showing the key lever locking device and the trip for releasing the key. Fig. 8 is a detail view showing the double lever device which regulates the time of cut-out of the motor. Fig. 9 is a diagrammatic view showing the motor circuits.

The motor 1 is mounted on a base plate 2 suitably secured to the typewriter frame 3. In the typewriter carriage 4 is the platen 5, and on the platen shaft are the hand wheel 6 and the line-spacing wheel 7. The pawl 8 for actuating the line-spacing wheel is carried by the slide 9, in turn actuated by the line-spacing bell-crank lever 10 pivoted at 11 to the carriage frame. Attached to the lever 10 is a link 12, and to the link 12 is attached a draw band 13 which passes over idler 14 and is secured to a drum 15 on a shaft 16 adapted to be driven by the motor. When the shaft 16 is turned counter-clockwise, the draw band is wound upon the drum and exerts a pull on the line-spacing lever which first line spaces the platen and then moves the carriage to the right.

The drum shaft 16 is in axial alinement with the motor shaft 17. It is in effect in part a sleeve loose on the end of the motor shaft, so that the motor shaft receives the

direct strain of the carriage. The drum shaft is adapted to be operatively connected to the motor shaft by means of a slip gearing such as described in my Patent No. 1,062,194, dated May 20, 1913, the purpose of the slip gearing being to provide a yielding connection between the motor and the driven parts to protect the mechanism from shocks in starting and from injury in event of obstruction, and also to permit of variation in speed of drive by regulation of the friction at the gear members. The friction members are two disks 18 and 19, the disk 18 being keyed to the drum shaft, and the disk 19 being keyed to the motor shaft. The disks present to each other flat friction faces, and are adapted to have slight relative movement longitudinally of their axis, whereby the driving connection between the two may be made or broken, or varied at will. Formed on the rear of each gear is an annular inclined surface adapted to serve as a wedge for forcing the gears together. Co-operating with these wedge surfaces are two rotary members 20 and 21, carried respectively by lever arms 22 and 23, and each comprised of two circular plates spaced apart to straddle the gears 18 and 19 and to engage the wedge surfaces thereof from opposite sides. When the lever arms 22 and 23 are rocked toward each other, the rotary members 20 and 21 act on the wedges to establish or increase the driving friction between the gears; and vice versa, when moved in the opposite direction, permit the discontinuance or decrease of the driving friction between the gears. The arm 22 is integral with a horizontally disposed arm 24 to form a bell crank lever pivoted to a block 27 attached to the base 2; and similarly the arm 23 forms with an arm 26 a bell crank lever pivoted at 28 to the block 27. The arms 24 and 26 are turned toward each other and are adapted to be simultaneously rocked by means of an arm 29 which overlaps their ends (see Figs. 5 and 6) and which is fast to a rock shaft 30 carried in brackets 31 secured to the base 2. Loosely mounted on the rock shaft 30, but adapted to be operatively connected thereto, is the motor control key lever 32. The key lever carries a lug 33 in which is mounted an adjustable stop or set screw 34 adapted, upon depression of the key lever, to engage a crank arm 35 fast to shaft 30, thereby rocking shaft 30 and arm 29, so that levers 22 and 23 are rocked to force together the friction gears. A coil spring 36 tends to return the key lever to normal, elevated position. Unless the key lever is depressed, any rotation of the gears 18 and 19 tends to throw off the pressure members 20 and 21 to relieve the friction.

Whenever the key lever is depressed, the circuit of the motor is closed. The speed of the drive will depend upon the extent to

which the key lever is depressed, or in other words, upon the amount of pressure exerted by the key lever upon the friction gears 18 and 19. In returning from a long line, the carriage may be allowed to acquire considerable speed and momentum, providing the power is discontinued in time to permit of dissipation of such momentum before the banking stops are reached. On the other hand, in returning from short lines, it is not desirable to throw the carriage at such high speed, since the time in which to take care of the carriage momentum may be insufficient to save the carriage from injurious shocks. Accordingly for a long line return, the key lever 36 is fully depressed, whereas for a return from a short line the depression of the key lever is only partial. The motor circuit established by any depression of the key may be traced as follows upon reference to Fig. 9: generator 37 of any suitable type, feed wire 38 to the motor, through the motor and by wire 39 to the motor casting indicated at 40, from the casting to the key lever 32 which is in metallic contact therewith, thence by way of key contact 41 and wire 42 to the generator. The key contact 41, (see Fig. 2) has a spring support 43 to permit of depression of the key lever to different degrees for different speeds; and is insulated by a block 44 from the base 2.

In order that in returning from long lines the power drive may be discontinued with certainty at the proper predetermined instant, the cut-off of the power is effected automatically. When depressed for a long line return, the key is engaged by a catch which holds it depressed until the catch is in turn acted upon by a time device and caused to release the key. This catch is shown as a bell crank lever pivoted at 45 to block 27, and having a horizontal arm 46, and a vertical arm 47 with a nose or hooked portion 48 on the upper end thereof for engagement with the key lever. The catch swings at right angles to the key lever. When the key is depressed, the key lever strikes the incline of the nose and throws back the catch. A spring 49 bearing against the under side of the horizontal arm 46 throws the catch forward again to pass the nose of the same over the key lever when the latter is sufficiently depressed, thus holding the key for the time being against return to normal position.

The time device for releasing the key lever from the catch is as follows: On the drum shaft 16 is a thread or worm 50 engaging a threaded collar or nut 51 which moves back and forth on the worm according to the direction of rotation of the drum shaft. Depending from the collar 51 is an arm 52 supporting an adjustable stop, or set screw, 53. A pin 52' secured to bracket 64 and parallel to the worm 50 passes loosely

through the arm 52 and serves to prevent angular movement of the arm. In alignment with the screw 53, as the latter moves with the collar 51, is the arm 54 of a bell crank lever pivoted at 55 to a bracket 56 on the base 2. The other arm 57 of this bell crank extends across and over the horizontal arm 46 of the key lever catch so that when the arm 54 is swung toward the motor, the catch will be swung away from the key lever to release the latter. The arm 54 is not however adapted to be directly engaged by the set screw 53, but only through the intermediary of a cross bar 58 supported from depending arms 60. Obviously the greater the thickness of the cross piece 58, the less the movement required for the collar 51 on the worm, or in other words, the less the number of revolutions of the drum and accompanying movement of the carriage before the set screw 53 acts through the bar 58 to trip the catch and release the key lever, to stop the carriage drive.

By reason of the adjustability of the set screw 53, the catch may be set, according to the length of the line, to operate after any predetermined throw of the carriage. Since however the lines will not be all of the same length, there will be some variation in the period remaining for slowing down the carriage. This variation will not be of importance if the lines are of approximately the same length, but where there is to be considerable variation in the length of the line a more exact regulation must be had. Like difficulties will be met if the release is of a character which is set to operate, when the carriage reaches a predetermined point, without regard of the length of throw to that point. With such a device, the accrued momentum would vary with the length of the line, and if this variation were wide, there could be no fixed period within which to take care of the momentum. Consequently, in any event, where the lines vary appreciably in length or where exactness and uniformity of action are desired, the cut-off must be set for each line according to the length of that line, and the setting will be a variable. Being a variable it must for practical purposes be automatically effected; and it is so effected in the present invention. Here the movement of the carriage, in writing the line, determines the setting to be given the cut-off device for the return from that line. The greater the carriage movement in writing the line, that is to say, the longer the line, the earlier the cut-off, or, the greater the period allowed for taking care of the momentum.

In the preferred form of the invention, the means for effecting the variation in time of operation of the release lever 57, comprises a cross piece 58 interposed between the trip and the set screw 53 carried by arm 52.

This cross piece is wedged shaped, tapering from a greater width at the bottom to a lesser width at the top. It is adapted to be adjusted or moved up and down between the trip and the screw 53; and, according to the width of the wedge at the point thereof in alinement with the screw 53, the screw will require a longer or a shorter time to effect the operation of the release trip. The wedge 58 is carried by or is integral with two arms 60, one at each end thereof. The arms 60 are pivotally suspended, each from one of two arms 61. The arms 61 are connected by a cross arm 62, and together with this cross arm in effect form a yoke which embraces and is pivoted at points 63 on the opposite edges of a bracket 64. If therefore the arms 61 are swung upward around their pivots 63, the arms 60 with the wedge will be lifted to present a thicker portion of the wedge to the set screw 53; the greater the upward swing of the yoke, the thicker the interposed portion of the wedge. The cross arm 62 limits the upward swing of the yoke.

One of the arms 61 (see Figs. 3 and 5) lies in the path of movement of a lug or projection 65 carried by the threaded collar 51 on the worm 50. In fact, the projection 65 by engagement with the arm 61 normally supports the yoke and the wedge, to prevent the same from swinging down around their pivots 63. The farther the collar 51 travels away from the drum the higher will the wedge be supported. During the writing of a line the letter feed of the carriage causes the draw band to be drawn off of the drum and the latter to be rotated clockwise. The worm 50 has a right hand pitch and therefore during the letter feed, the collar 51 and projection 65 move away from the drum, lifting the wedge higher and higher. The longer the line, the greater the lift of the wedge and the thicker the part thereof presented to the screw 53. Finally the end of the line is reached, and the key is depressed to apply the power to rotate the drum in the opposite direction for returning the carriage. Reversal of movement of the drum means reversal of movement of the worm and collar, and, since the wedge supporting yoke rests on the collar, the wedge would drop during the return of the carriage before the time for the cut-off, unless provision to the contrary is made. To prevent the wedge from dropping until after the cut-off, there is provided a means, operated by the key, for engaging and preventing movement of the wedge supporting yoke while the key is locked down. This means comprises a cam member 66 pivoted at 67 to a bracket 68 on the base 2, and adapted to swing in a vertical plane at right angles to the planes of movement of the key lever and of the wedge supporting yoke. When swung to the right and held, the cam member is adapted to en-

gage and hold a flared extension 69 integral with one of the yoke arms 61, thus holding the wedge from falling when the worm and collar reverse movement. This flared extension is resilient so that wear or play of the parts will not result in slipping. The flare provides for engagement of the cam with the yoke through a wide range of angular position of the latter. The key lever moves in a slot 70 in the bracket 68, and the cam member 66 projects across this slot so that when the key is depressed far enough, the cam must inevitably be forced against the flared portion of the yoke. The wall of the slot 70 prevents lateral displacement of the key lever when the same is pressed against the cam.

When the return of the carriage has progressed to the cut-off point, as determined by the elevation of the wedge the trip is operated and the key lever is released. As soon as the coil spring 36 throws up the key lever, the latter separates from the switch contact 41 and withdraws from the cam 66, and the latter swings away from the yoke. The weight of the yoke, with the wedge, causes the yoke to fall toward the drum, when released from the cam 66, until the arm 61 strikes the projection 65 on the collar 51 which at this time is in its extreme right hand position awaiting the commencement of the new line. The operation is then repeated for the next line.

For short lines only, the key lever is not ordinarily depressed far enough to be locked by the catch 47, so that the automatic cut-out is not used. It is therefore unnecessary at such times to have the cam 66 engaged by the key to lock the wedge supporting yoke. In writing short lines the key must be depressed sufficiently to establish driving friction between the gears, but this friction is not to be sufficient to prevent slipping; according to the amount of slip the carriage return may be as slow as desired. Where the carriage return is slow, the key may be held depressed until the banking stops or other carriage stops are actually reached, and there will be no objectionable shock to the mechanism. The slip gear also permits independent rotation of the motor when the stops are reached, and thus protects the mechanism against possibility of injury by the motor.

When it is desired to line space without returning the carriage, the key is given a slight and short depression, the resulting grip of the gears being insufficient to effect movement of the carriage although sufficient to rock the line spacing lever.

The carriage may be returned by hand in the usual manner when desired. To prevent slack in the draw band when the carriage is returned by hand, a circuit is established through the motor at such times, causing the

latter to turn the drum at a sufficient speed to take care of the slack. For closing the motor circuit upon hand return movement of the carriage, the following means is provided: Loosely supported at one end in a sleeve 71 which is fast to the scale plate 72 is a rod 73, the other end of which rests upon the banking stop 74. The rod 73 is adapted to have slight longitudinal movement on its bearings, and, when thrown to the right, engages a contact strip 75 mounted on a block of insulating material 76 secured to the typewriter frame. A hook 77, also attached to block 76, is adapted to be swung over the rod 73 to hold the same on its seat on the carriage stop. Embracing the rod 73 is coil spring 78 attached at one end to an arm 79 in turn attached to the link 12 which moves with the line spacing lever. The frictional engagement of the spring 78 with the rod 73 is sufficient to cause the rod to move with the carriage until it strikes the contact 75. Upon further movement of the carriage the spring 78 then merely slides along the rod 73. Similarly upon movement of the carriage in letter feed direction, the rod is withdrawn from the contact and moves to its abutment at the sleeve 71, and thereafter, during letter feed, the spring slides along the rod. When the carriage is given a return movement and brings the rod 73 to the contact 75 the motor circuit is as follows: generator 37, wire 38, motor 1, wire 39 to motor casting, thence to typewriter frame in metallic contact with motor casting, thence to rod 73, contact 75, wire 80, wire 42 and back to generator (see Fig. 9). The friction between the clutch members 18 and 19 and between the drum 15 and the motor shaft is sufficient to cause the drum to rotate and take up the slack in the band 13 when the carriage is returned by hand, or the line-spacer operated by hand, but is insufficient to return the carriage. The return movement of the line-space lever 10 moves the rod 73 to the left and opens the circuit at the contact 75.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut-off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device having a variable adjustment or movement automatically proportioned in each instance to the extent of letter feed or forward movement of the carriage whereby the device is set to time the power cut-off on the return movements in accordance with the length of the line from which the return is made.

2. In a typewriting machine, the combi-

nation of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut-off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising an adjustable element for varying the time of cut-off according to the length of the line from which the return is made, means whereby said adjustable element may be moved proportionately to the movement of the carriage when the latter moves forward, and means for holding said adjustable element against return movement with the carriage until after the cut-off has been effected.

3. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut-off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising an adjustable element for varying the time of cut-off according to the length of the line from which the return is made, means whereby said adjustable element may be moved proportionately to the movement of the carriage when the latter moves forward, and means for holding said adjustable element against return movement with the carriage until after the cut off has been effected, said adjustable means returning automatically to normal position when said carriage is returned.

4. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut off after the carriage has traveled part way to the starting point but before it has reached the starting point, said devices comprising an adjustable element for varying the time of cut-off according to the length of the line from which the return is made, means whereby said adjustable element may be moved proportionately to the movement of the carriage when the latter moves forward, and means for holding said adjustable element against return movement with the carriage until after the cut off has been effected, said adjustable means returning automatically to normal position when said carriage is returned.

5. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut-off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising an adjustable wedge for varying the time of cut-off ac-

5 cording to the length of the line from which the return is made, means whereby said adjustable wedge may be moved proportionately to the movement of the carriage when the latter moves forward.

6. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut-off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising an adjustable element for varying the time of cut-off according to the length of the line from which the return is made, means whereby said adjustable element may be moved proportionately to the movement of the carriage when the latter moves forward, and means operated by the carriage return key for holding said adjustable element against return movement with the carriage until after the cut-off has been effected.

7. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising a gear having a driving connection controlled by the letter feed or forward movement of the carriage and having means movably by said gear to various settings according to the extent of such letter feed or forward carriage movement, the time of the power cut-off on the return movement from each line being determined by the setting of said device effected when such line was written.

8. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising a worm having a driving connection controlled by the letter feed or forward movement of the carriage, a threaded element engaged by said worm to be moved by the same a distance determined by the extent of forward movement of the carriage, a cut-out switch, and means controlled by said threaded element for causing said switch to be operated in each instance on the return movement of the carriage, at a time which is predetermined by the extent of movement of said threaded element during the writing of the line.

9. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut off after the

carriage has begun the return movement but before it has reached the starting point, said device comprising a worm having a driving connection controlled by the letter feed or forward movement of the carriage, a threaded element engaged by said worm to be moved by the same, a wedge movable with said threaded element during the writing of a line, a cut-out switch, and connections for throwing said switch, said wedge being adapted to be included in said switch connections and to vary the time of operation of the same on return movement of the carriage according to the setting given the wedge by the threaded element, whereby the time of cut-off is determined by the length of the written line from which the return is made.

10. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a device for causing the power of the return drive to be cut off after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising a worm having a driving connection controlled by the letter feed or forward movement of the carriage, a threaded element engaged by said worm to be moved by the same, a wedge movable with said threaded element during the writing of a line, a cut-out switch, connections for throwing said switch comprising a carriage return key, said wedge being adapted to be included in said switch connections and to vary the time of operation of the same on return movement of the carriage according to the setting given the wedge by the threaded element, whereby the time of cut-off is determined by the length of the written line from which the return is made, and means operated by the carriage return key for holding said wedge in its adjusted position until after the cut-off.

11. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, means for cutting off the motive power after the carriage has traveled part way to the starting point but before it has reached the starting point, and means for varying the time of such power cut-off for successive lines in accordance with the length of the line from which the return is made.

12. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a key for making and breaking the power drive, means whereby the key when thrown to position to make the power drive is held in that position to maintain the power drive, and means for releasing the key to break the power drive before the

starting position of the carriage is reached on the return movement, said last named means being adjustable to have a variable time of action according to the length of the line from which the return is made.

13. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a key for making and breaking the power drive, means whereby the key when thrown to position to make the power drive is held in that position to maintain the power drive, and means for releasing the key to break the power drive before the starting position of the carriage is reached on the return movement, said last named means having connections to the carriage whereby it may be adjustably set upon the forward or letter feed movement of the carriage to vary its time of action on the return movement in accordance with the length of line from which the return is made.

14. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, a key for making and breaking the power drive, means whereby the key when thrown to position to make the power drive is held in that position to maintain the power drive, means for releasing the key to break the power drive before the starting position of the carriage is reached on the return movement, said key releasing means comprising a latch, a movable abutment, a wedge adjustable transversely to said abutment between the same and the latch, and means for moving said abutment during the carriage return whereby, according to the adjusted position of the wedge, the latch will be operated, after a longer or shorter return movement, to release the key.

15. In a typewriting machine, the combination of a carriage, an electrical motor, connections from the motor to the carriage for returning the latter, a switch for making and breaking the motor circuit, means for throwing the switch to break the motor circuit after a predetermined return movement of the carriage less than the complete return movement, a contact device which travels toward the switch throwing device during the carriage return movement, a tapered block adjustably interposed between said traveling contact and the switch throwing device, and means controlled by the forward or letter feed movement of the carriage for adjusting the position of said tapered block to vary the time of cut-off in accordance with the length of the line from which the return is made.

16. In a typewriting machine, the combination of a carriage, an electrical motor, connections from the motor to the carriage for returning the latter, a switch for making

and breaking the motor circuit, means for throwing the switch to break the motor circuit after a predetermined return movement of the carriage less than the complete return movement, a contact device which travels toward the switch throwing device during the carriage return movement, a tapered block adjustably interposed between said traveling contact and the switch throwing device, means controlled by the forward or letter feed movement of the carriage for adjusting the position of said interposed block to vary the time of cut-off in accordance with the length of the line from which the return is made, said last named means comprising a lever by which said block is supported, and means for moving said lever as the carriage moves forward in letter feed direction.

17. In a typewriting machine, the combination of a carriage, an electrical motor, connections from the motor to the carriage for returning the latter, a switch for making and breaking the motor circuit, means for throwing the switch to break the motor circuit after a predetermined return movement of the carriage less than the complete return movement, a contact device which travels toward the switch throwing device during the carriage return movement, a tapered block adjustably interposed between said traveling contact and the switch throwing device, means controlled by the forward or letter feed movement of the carriage for adjusting the position of said interposed block to vary the time of cut-off in accordance with the length of the line from which the return is made, said last named means comprising a lever by which said block is supported, means for moving said lever as the carriage moves forward in letter feed direction, and means for holding said lever with said block against return movement with the carriage until after the cut-off.

18. In a typewriting machine, the combination of a carriage, an electrical motor, connections from the motor to the carriage for returning the latter, a switch for making and breaking the motor circuit, means for throwing the switch to break the motor circuit after a predetermined return movement of the carriage less than the complete return movement, a contact device which travels toward the switch throwing device during the carriage return movement, a tapered block adjustably interposed between said traveling contact and the switch throwing device, means controlled by the forward or letter feed movement of the carriage for adjusting the position of said interposed block to vary the time of cut-off in accordance with the length of the line from which the return is made, said last named means comprising a lever by which said block is supported, means for moving said lever as the carriage moves forward in letter feed direc-

tion, a key for operating the switch, and a cam operated by the key to engage the block supporting lever and thus to hold the block until after the cut-off on the return movement.

19. In a typewriting machine, the combination of a carriage, an electrical motor, a draw band connecting the motor to the carriage whereby a power return drive of the latter may be effected, means whereby the carriage may also be returned by hand, and means for closing a circuit through the motor, when the carriage is returned by hand, to effect a drive of the motor sufficient to take up and prevent slack in the draw band, said circuit closing means comprising a contact member support on the typewriter frame and free to have slight longitudinal movement thereon in the direction of movement of the carriage, a fixed contact piece in the path of movement of said first contact when the same is moved in carriage return direction, resilient means attached to the carriage and bearing against said movable contact with sufficient force to cause the contact to move with the carriage until the movable contact strikes the fixed contact at the beginning of the return movement of the carriage.

20. In a typewriting machine, the combination of a carriage, an electrical motor, a draw band connecting the motor to the carriage whereby a power return drive of the latter may be effected, means whereby the carriage may also be returned by hand, and means for closing a circuit through the motor, when the carriage is returned by hand, to effect a drive of the motor sufficient to take up and prevent slack in the draw band, said circuit closing means comprising a metallic rod supported on the typewriter frame and free to have slight longitudinal movement thereon in the direction of movement of the carriage, a fixed contact piece normally insulated from said rod and in the path of said rod when the latter is moved in carriage return direction, a coil spring attached to the carriage and embracing said rod so as to bear against the same with force sufficient to effect movement of the rod to the fixed contact when the carriage return is started, the spring thereafter slipping over the rod during the carriage return movement.

21. In a typewriting machine, the combination of a carriage, an electrical motor, connections from the motor to the carriage for returning the latter, a switch for making and breaking the motor circuit, means for throwing the switch to break the motor circuit after a predetermined return movement of the carriage less than the complete return movement, a contact device which travels toward the switch throwing device during the carriage return movement, a

tapered block adjustably interposed between said traveling contact and the switch throwing device, means controlled by the forward or letter feed movement of the carriage for adjusting the position of said interposed block to vary the time of cut-off in accordance with the length of the line from which the return is made, said last named means comprising a lever by which said block is supported, means for moving said lever as the carriage moves forward in letter feed direction, a key for operating the switch, and means operated by said key for holding said lever and block against return movement with the carriage until after the cut-off.

22. In a typewriting machine, the combination with a traveling carriage, of a motor for returning the same, a friction clutch intermediate said motor and carriage, a key for causing said clutch to seize to varying extents, means for locking said key to hold said clutch in seizing position, and automatic means for releasing said clutch after a predetermined travel of said carriage.

23. In a typewriting machine, the combination with a traveling carriage, of a motor for returning the same, a friction clutch intermediate said motor and carriage, a key for causing said clutch to seize to varying extents, automatic means set by the moving of said key to its limit for locking said key to hold said clutch in seizing position, and automatic means for releasing said clutch after a predetermined travel of said carriage.

24. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for effecting the return of the latter, said connections including a friction gear, a key controlling the motor drive, means whereby upon part depression of said key the friction gear is set to cause the motor to drive the carriage at one speed, and upon further depression of said key the friction gear is set to cause the motor to drive the carriage at a higher speed, a latch to hold the key in said last-named position, and means to automatically trip the latch at a point variable with the length of the carriage return.

25. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for effecting the return of the latter, said connections including a friction gear, a key controlling the motor drive, means whereby upon part depression of said key the friction gear is set to cause the motor to drive the carriage at one speed, and upon further depression of said key the friction gear is set to cause the motor to drive the carriage at a higher speed, means whereby the key when depressed for either speed of carriage drive acts to close a circuit through the motor, a

latch to hold the key fully depressed, a trip to release the latch during the carriage return, and means to automatically vary the point at which the trip operates.

5 26. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for effecting the return of the latter, said connections including a friction gear, a key controlling the motor drive, means whereby upon part depression of said key the friction gear is set to cause the motor to drive the carriage at one speed, and upon further depression of said key the friction gear is set to cause the motor to drive the carriage at a higher speed, a resilient contact adapted to be engaged by the key upon depression of the latter sufficient to effect carriage drive at the first speed, and adapted to yield with the key to permit of depression of the latter for carriage drive at the other speed, means to hold the key in the high speed position, and a device adjusted by the forward travel of the carriage to release the key during the return of the carriage at a point in the carriage travel automatically variable with the distance the carriage is returned.

27. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, including a friction clutch, a key controlling the clutch and the supply of power from the motor to the clutch, and means for holding said key depressed during the continuance of the said power supply and for releasing said key and causing the power supply to cease at a point automatically variable with the distance through which the carriage has been returned.

40 28. In a typewriting machine, the combination of a carriage, a motor, connections from the motor to the carriage for returning the latter, including a friction clutch, a device for causing the power supply from the motor to the clutch to be cut off, and the clutch to be released after the carriage has traveled part way to the starting point but before it has reached the starting point, said device comprising means to automatically vary the point at which the clutch is released to correspond with the distance through which the carriage is returned, a key for establishing said power supply, and means for holding the key depressed to effect a continuance of the said power supply until said device operates.

29. In a typewriting machine, the combination of a carriage, means to return the carriage, a source of power to drive said returning means, means for cutting off said power during the return run of the carriage, means effective during the return of the carriage for determining the point at which the power shall be cut-off, and means moving with the carriage during the forward travel

thereof, for adjusting said determining means, so that the position at which the cutting-off means shall be subsequently effective depends upon the length of the run of the carriage in forward direction.

30. In a typewriting machine, the combination of a carriage, return mechanism therefor, a motor, means to connect the motor to said mechanism for returning the carriage, and means to disconnect the motor at a point varying with the distance through which the carriage has been returned.

31. In a typewriting machine, the combination of a carriage, return mechanism therefor, a motor, a clutch between the motor and said mechanism, a manual clutch operating device to connect the motor with said mechanism, and means automatically to release the clutch at a point varying with the distance through which the carriage is returned.

32. In a typewriting machine, the combination of a carriage, carriage return mechanism, a power device to operate said mechanism, a lever operable to connect the power device with said mechanism, a lock to hold the said lever in operated position, and means to release said lock during the return of the carriage at a point varying with the distance through which the carriage has been moved.

33. In a typewriting machine, the combination of a carriage, return mechanism therefor, an electric motor, a clutch between the motor and said mechanism, a finger-key operable to engage the clutch members and to establish a circuit for the motor, means to hold the said key in operated position, and means to automatically release said key at a predetermined point in the return movement of the carriage variable with the distance through which the carriage has been returned.

34. In a typewriting machine, the combination of a carriage, return mechanism therefor, an electric motor, said return mechanism comprising the draw-band connected to the carriage and a winding drum, a clutch between said drum and motor, means to operate the clutch and establish a circuit for the motor to return the carriage, said drum having a frictional connection with the motor sufficient to rotate the drum independently of the operation of the clutch, and means operated by the manual return of the carriage to close a circuit to the motor and thereby cause the slack in the draw-band to be taken up.

35. In a typewriting machine, the combination of a carriage, a winding drum, a draw-band connecting said carriage and drum, an electric motor having a frictional driving connection with the drum sufficient to rotate the latter to take up slack in the draw-band, a clutch between the drum and

the motor operable to increase the driving power transmitted to the drum, means to operate said clutch and cause the motor to return the carriage, and means to cause the
5 operation of the motor to take up slack in the draw-band when the carriage is manually returned.

36. In a typewriting machine, the combination of a carriage, a platen line-space
10 lever, a draw-band connected to said lever, a winding drum, an electric motor a rod extending longitudinally of the machine frame and movable longitudinally, means to close the motor circuit by said movement of the

rod, and a device connected to the draw- 15 band, and having a frictional sliding engagement with said rod to operate the latter.

37. In a typewriting machine, the combination of a carriage, power-operated return mechanism therefor, means for cutting off
20 the power, and means dependent upon the distance through which the carriage is returned for automatically varying the point at which the power is cut off.

JACOB SOKOLOV.

Witnesses:

PAUL ZIRON,
F. D. AMMEN.