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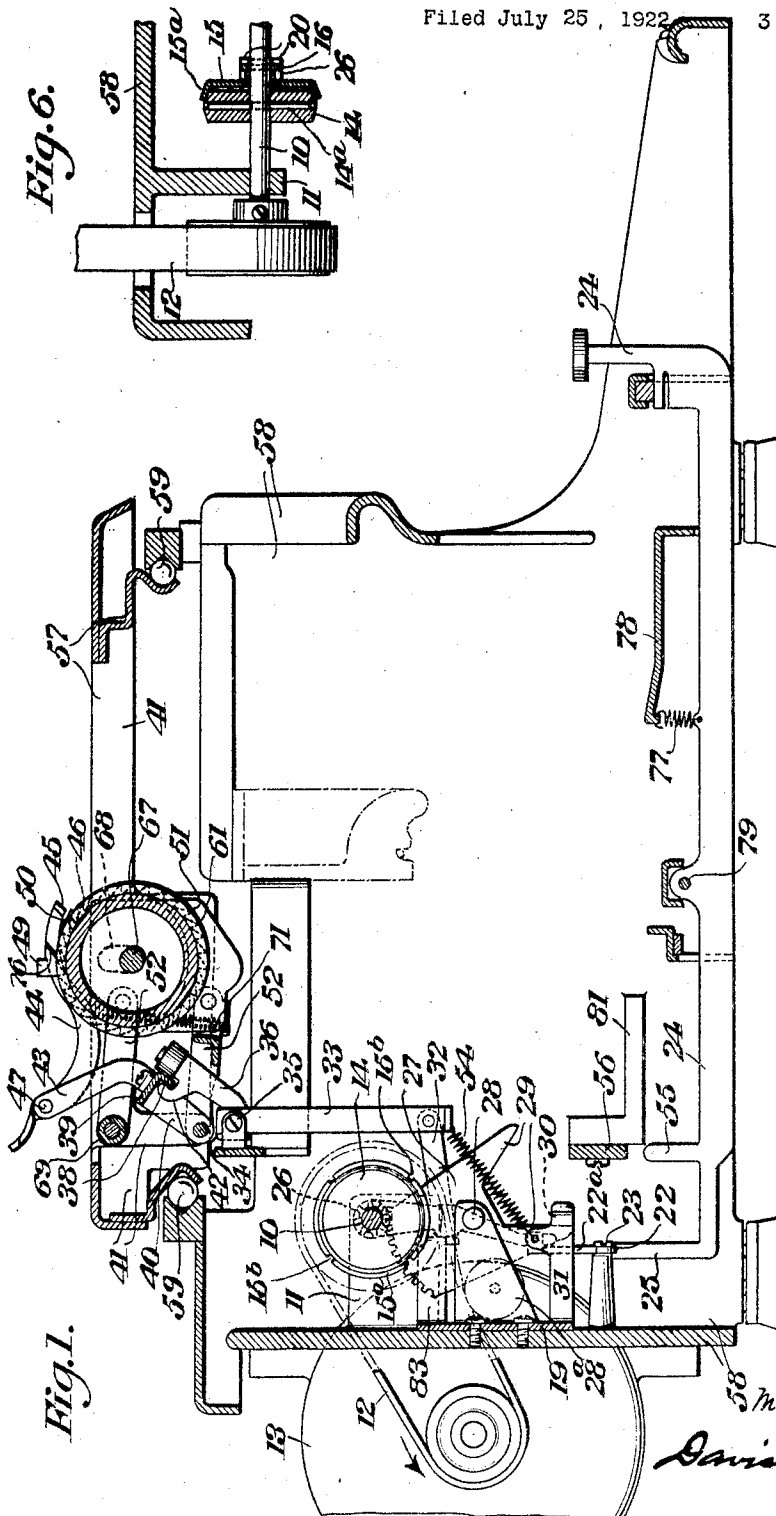
1,469,776

M. C. CRAWLEY

TYPEWRITING MACHINE

Filed July 25, 1922

3 Sheets-Sheet 1



INVENTOR
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ATTORNEYS

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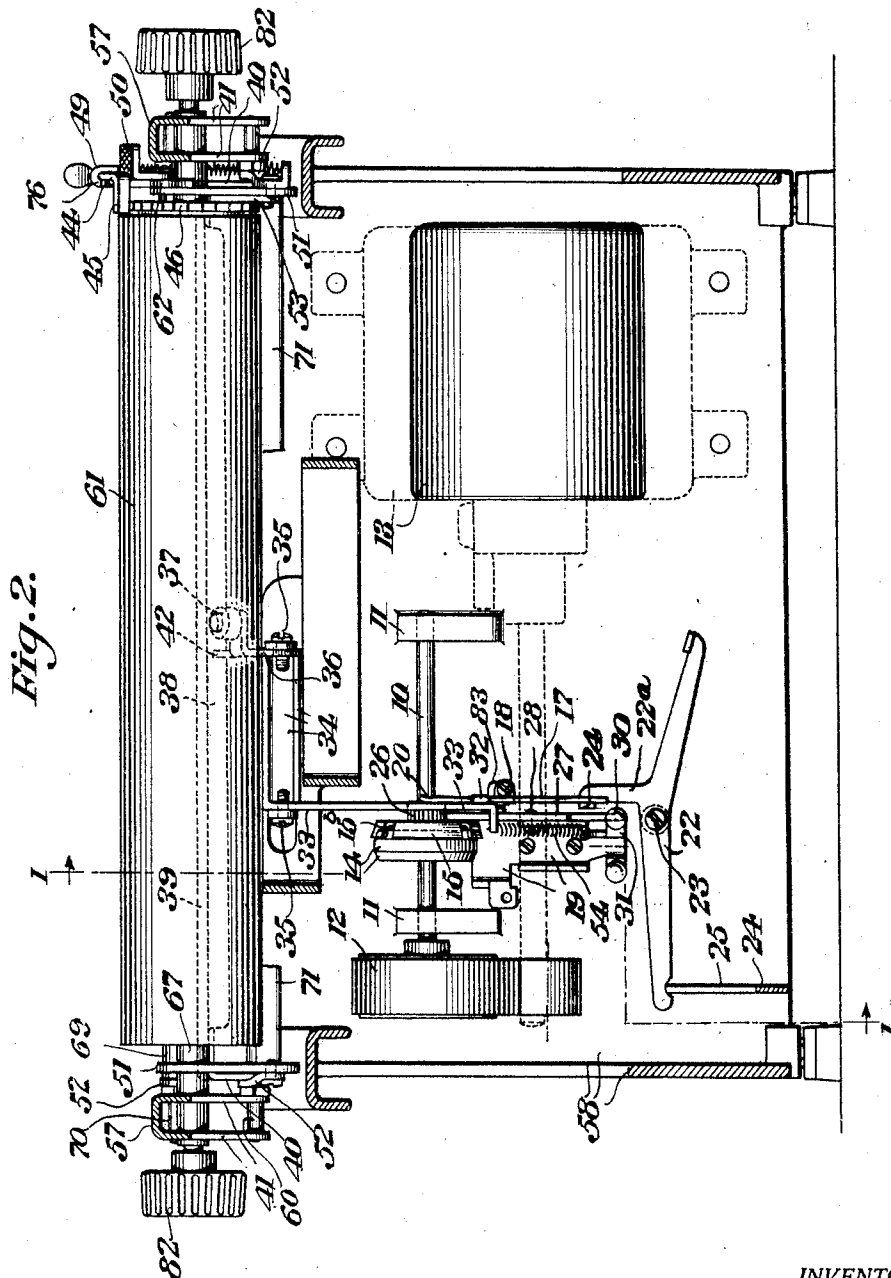
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3 Sheets-Sheet 3

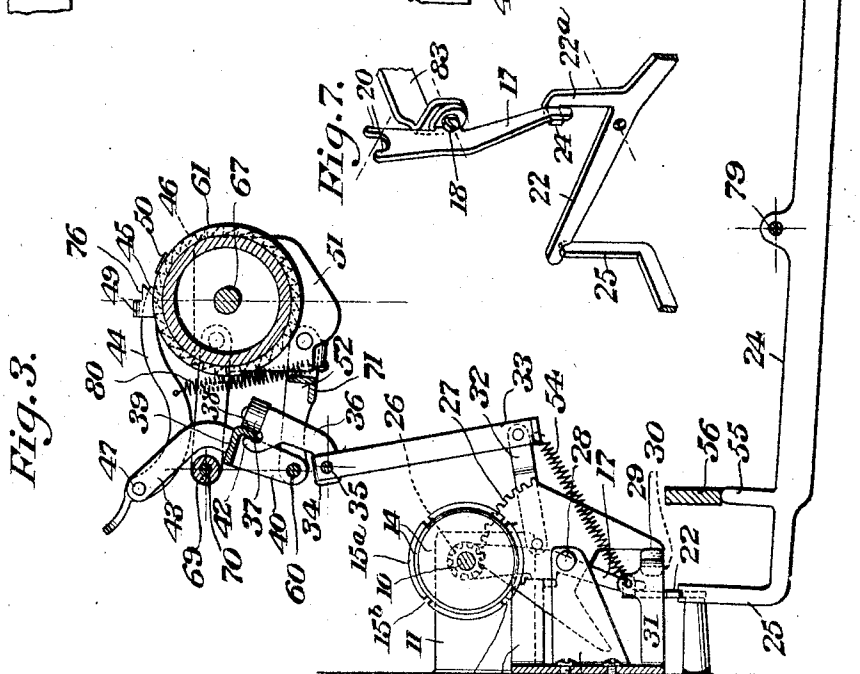
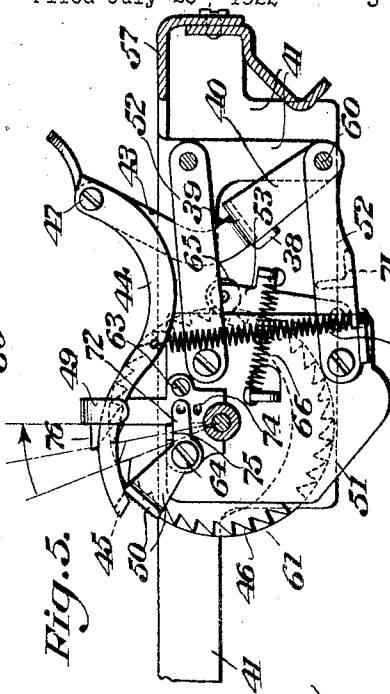
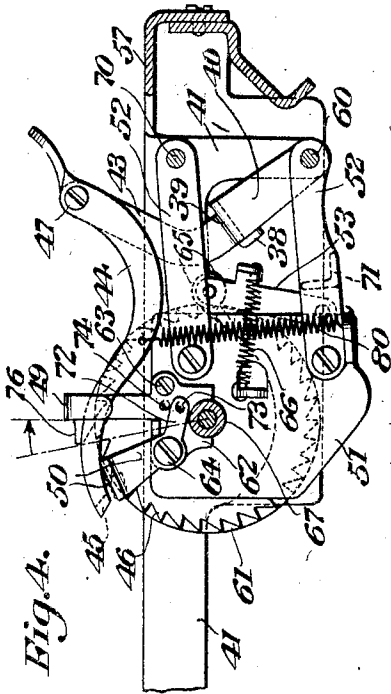


Fig. 7.

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UNITED STATES PATENT OFFICE.

MANSFIELD C. CRAWLEY, OF GROTON, NEW YORK, ASSIGNOR TO ADDOGRAPH COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

TYPEWRITING MACHINE.

Application filed July 25, 1922. Serial No. 577,353.

To all whom it may concern:

Be it known that I, MANSFIELD C. CRAWLEY, a citizen of the United States of America, and a resident of Groton, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a full and clear specification.

This invention has relation to mechanism for rotating the platen roll for line-spacing, and it is especially adapted for use in connection with a motor-driven continuously running power shaft journaled in the machine frame, key-controlled means being provided whereby power may be taken off said shaft to actuate the line-spacing mechanism, as more fully hereinafter set forth.

In the drawing, Fig. 1 is a vertical sectional view of a typewriting machine showing one adaptation of my invention;

Fig. 2 is a transverse sectional view of the machine, looking rearwardly.

Fig. 3 is a fragmentary vertical sectional view of the machine, showing the position of the parts at the end of a line-spacing operation;

Fig. 4 is an end elevation of the platen and associated mechanism, showing the parts as they appear in normal position, the pawl-guard being adjusted for making a single line space;

Fig. 5 is a view similar to Fig. 4, showing the pawl-guard adjusted for making a double line space;

Fig. 6 is a transverse sectional view taken through the friction clutch; and

Fig. 7 is a fragmentary perspective view of the clutch-operating means.

Referring to the various parts by numerals, 10 designates a counter-shaft extending transversely of the machine and journaled in bearings 11 attached to the rear wall of the machine frame, this shaft being adapted to be continuously driven during the operation of the machine, by means of a belt 12 which is driven by an electric motor 13 supported on the rear wall of the machine. Mounted on the shaft 10 is a disk-like driving member 14 of a friction-slip clutch, this member being formed of fiber and having its periphery tapered toward one end to form a conoidal friction surface. Member 14 is rigidly held to the shaft so as to rotate therewith, by means of a pin 14^a

driven through said member and shaft. A driven or loose friction clutch member 15 is mounted loosely on the shaft and is adapted to slide longitudinally thereon. Member 15 is formed of sheet metal and comprises a disk having a flaring or conoidal flange 15^a adapted to grip the conoidal friction surface of member 14 and cut away at intervals at 15^b to form spaced gripping portions whose radial edges function as scrapers during relative slipping or rotation of the clutch members and keep the conoidal gripping surface of member 14 free from oil and dirt, thereby keeping the clutch in efficient condition.

The slidable member 15—15^a of the clutch is adapted to be pressed into engagement with the driving clutch member 14 by means of a vertical lever 17 having a laterally bent ear pivotally held by a screw 18 to the laterally bent forward end of an arm 83 extending forward from the plate 19 affixed to a boss on the rear wall of the machine frame, this lever being of resilient sheet metal so as to laterally flex or yield, and being provided with a forked upper end 20. A forwardly bent lug 21, on the upstanding arm 22^a of a bell-crank lever 22 pivoted at 23 on a boss on the rear frame wall, is adapted to press inwardly against the outer face of lever 17 at the lower end of said lever 17. The lever 22 is adapted to be rocked on its pivot by a line-space key lever 24 whose rear end 25 extends upwardly so as to engage in a notch formed in the under edge of the outwardly extending arm of said lever 22. With this mechanism, it will be seen that depression of the key-carrying end of the lever 24 causes the lever 22—22^a to rock the upper end of lever 17 outward to press clutch member 15—15^b against clutch member 14, thus causing said member 15—15^b to rotate.

Affixed rigidly to the loose clutch member 15—15^b is a toothed pinion 26 which is in constant mesh with the teeth of a segment 27 pivotally supported at 28 on an arm 28^a extending forwardly from plate 19 to rock fore-and-aft of the machine. The lower end of the swinging segment is bifurcated to form two separated stop-fingers 29 which are adapted to alternately abut against opposite ends of a double-end or duplex rubber bumper or stop 30 supported on the laterally bent forward end of an arm 31 on plate 19, said stop being adjustable fore-and-aft

of the machine by bending the laterally extending portion of the supporting arm 31. Pinion 26 is sufficiently long to engage segment 27 in all shifted positions of clutch member 15. A washer 16 is loosely mounted on shaft 10 between the forked end 20 of clutch lever 17 and the inner end of pinion 26.

The segment 27, at a point above its pivot, is connected by means of a link 32 to the lower end of a rock arm 33 the upper end of which is formed integrally with one end of a rock shaft 34 of channel form in cross section and desirably formed of sheet metal. The shaft 34 is rockably mounted on pivots 35 supported on a stationary part of the machine frame, the axis of this rock shaft being located at a point below and to the rear of the platen. Affixed to the other end of the rock shaft 34, and preferably formed integrally therewith, is an arm 36 which extends upwardly and forwardly and has journaled on its laterally bent upper extremity a roller 37. This roller 37 engages the under face of a flange 38 which is inclined in the direction of the surface of the roller so that the roller at all times runs square on the flange while the parts are in normal position. This flange 38 is a part of a rail 39 which travels with the platen carriage 57 and extends transversely of the machine, said rail being as long as the maximum distance of travel of the carriage, so that in all positions of the carriage engagement of the roller 37 with the rail will be maintained. The carriage 57 travels transversely of the machine frame 58 on suitable bearings 59. The rail is carried by a pair of arms 40 which extend downwardly and rearwardly and are pivoted on a rod 60 supported at its ends in depending flanges 41 on the carriages, so that the rail 39 is capable of upward and rearward swinging movement relatively to the platen supporting shift frame hereinafter described. A hook 42 formed on the arm 36 extends upwardly behind the rail flange 38, so as to thereby interlock the rail 39 with the roller 37 and arm 36 and thus insure the rail positively moving with the roller in both movements.

Extending upwardly and rearwardly from the right-hand end of the rail 39 is an arm 43, and pivotally mounted at 47 on the upper end of this arm is a line-space pawl 44 whose curved forward end is bent inward to provide a tooth 45 positioned to engage in the teeth of a ratchet wheel 46 held to one end of the platen 61 to rotate with said platen. An upstanding hook 49, engaging over the pawl 44, assists in guiding the pawl in its movements and, for the purpose of varying the line-spacing, I provide a pivoted regulating device or pawl-guard 50. The hook 49 is formed on a plate

62 held to one of the side plates 51 of the platen shift frame by screws 63 and 64, the screw 64 serving as a pivot for the regulating device 50. The regulator 50 has a laterally bent finger piece at its free end, on the inner end of which the free end of the line-space pawl normally rests with its tooth 45 out of engagement with the teeth of ratchet wheel 46. A detent lever 53 is pivoted at its lower end on plate 51, and a roller 65 on the upper end of said lever is yieldably held against the toothed edge of the ratchet wheel by a spring 66 connecting the lever and plate 51 to prevent accidental rotation of the platen, as is usual in line-spacing mechanisms.

The platen shaft 67 is journaled in bearings in the side plates 51 of the shift frame, which are pivotally connected to the forward ends of two pairs of superposed parallel links 52. The two upper links are rigidly connected at their rear ends by a sleeve 69 rotatable on a rod 70 supported in flanges 41 on the side rails of the platen carriage 57, while the two lower links are pivotally held at their rear ends to the pivot rod 60 and are rigidly connected by a rail 71 with which suitable mechanism (not shown) is connected for moving the shift frame and platen upwardly for printing upper-case characters. The side flanges of the carriage are provided with slots 68 in which the platen shaft is movable up and down in case-shifting operations. A desirable form of case-shift mechanism for actuating the shift frame is shown in my Patent 1,455,109, dated May 15, 1923.

As rail 39 and arm 43 thereon are mounted on one of the pivot rods of the shift frame, it will be obvious that the relation between these parts and arm 36 will not be changed by the upward movement of the shift frame and platen to upper-case position. It will also be observed that a line through the pivot 47 of the pawl and its point of support on regulator 50 is substantially parallel with links 52, and that the case-shift movement will not interfere with the proper action of the pawl on the ratchet wheel. It will also be noted that arms 40 of the rail 39 and arm 36 are so arranged and pivoted as to swing substantially in parallelism so that there is practically no canting action of roller 37 relatively to the rail flange 38.

The regulating device 50 is shiftable to either of two positions, as shown in Figs. 4 and 5, to determine whether the tooth 45 or pawl 44 shall drop in front of the first tooth of ratchet wheel 46 forward of hook 49, or in front of the second tooth in advance of said hook, and thus determine whether the ratchet wheel shall be rotated one tooth space or two tooth spaces for single or double line spacing. The rearward movement of pawl 44 is arrested by engagement of the

rear edge of pawl tooth 45 with the forward edge of the upstanding shank of hook 49. A resilient laterally flexible detent arm 72 on the sheet metal regulating device 50 has a portion thereof pressed inward to form a stud 73 adapted to snap in either of two depressions 74 in plate 62 to frictionally hold the regulating device in its different adjusted positions. A lug or limiting stop 75 on plate 62 arrests the swinging movement of the regulator at the two positions shown in Figs. 4 and 5 to prevent overthrow of the regulator by the operator in adjusting said regulator. The shank of hook 49 is formed with a cam lug 76 on its forward edge, the lower edge of which lug inclines downward and rearward and is engaged by pawl tooth 45 during the latter part of the rearward or active line-spacing movement of pawl 44. A restoring spring 77 connects key lever 24 with a stationary frame plate 78, said lever being pivotally supported on a fulcrum rod 79 mounted in the machine frame.

With the parts in normal position, as shown in Figs. 1 and 2, when it is desired to rotate the platen 61 for line-spacing the operator depresses and immediately releases the key on key lever 24. The downward movement of the key causes the parts to practically instantly assume the positions shown in Fig. 3. The upward movement of the rear end 25 of the key lever causes lug 21 on arm 22^a of lever 22 to press inward on the lower end of the clutch shifting lever 17, thus rocking the forked upper end 20 of lever 17 outward and pressing the driven member 15 of the clutch against the driving clutch member 14. Clutch member 15 and pinion 26 are thereby rapidly rotated to rock segment 27 until its forward stop finger 29 abuts stop 30, when these parts will be arrested and member 14 will slip or rotate relatively to member 15. This movement of segment 27 causes link 32 to rock arm 33 on the rock shaft 34 forwardly, thus swinging arm 36 on said shaft upwardly and rearwardly. This movement of arm 36 swings the U-shaped frame 39—40 and the arm 43 thereon upwardly and rearwardly, thus pulling pawl 44 rearwardly, whereupon the tooth 45 of the pawl will drop off regulator 50 in front of a ratchet wheel tooth and rotate the ratchet wheel and platen one or more line spaces, according to the adjustment of the regulator. As tooth 45 moves rearwardly it engages the inclined lower edge of cam lug 76 on hook 49 and is jammed down between two adjacent teeth of the wheel and against the forward edge of the shank of hook 49 at the end of the rearward movement of the pawl, to positively lock the ratchet wheel and platen against overthrow. A coil spring 80 connects pawl 44 with one of the links 52 of the shift frame and serves

to snap the tooth of the pawl down into engagement with the teeth of the ratchet wheel as the pawl is drawn rearward.

The parts will remain in this shifted position until the operator releases the key lever 24. Upon release of the key lever 24 a retractile coil spring 54, connecting the lower end of rock arm 33 to an ear carried by the aforesaid plate 19, will restore all the parts to normal position, ready for another operation. The interlocking arrangement between the arm 36 and the rail 39 will ensure the return to normal position of the line-spacing pawl. The rear stop finger 29 on the segment 27 will abut the rear face of the stop 30 and thus arrest the parts in proper position for another operation. Inasmuch as the operation of the mechanism is exceedingly quick after the clutch members are brought into contact, it is practically impossible for the operator to release the key on the key lever 24 before the line-spacing operation is completed; hence it is desirable that there shall be a slipping action at some point in the power-driven means. For this reason I have found it highly advantageous to employ a friction-slip clutch and put the same into action by manual force exerted through the key lever. The clutch shown is practically noiseless in operation. I have found that it requires but very slight pressure to cause the clutch to actuate the line-spacing mechanism, and consequently the clutch members readily slip one on the other. To prevent a too great degree of pressure being brought upon the clutch members through the medium of the key lever, I provide the key lever with a stop lug 55 which is adapted to strike against a rigid transverse frame bar 56 supported at its ends on bosses 81 on the side walls of the machine frame, and to still further provide against a too severe thrust on the friction clutch I make the depending end of the sheet metal lever 17 resilient, so that it will laterally yield when the line-space key is depressed and thus ensure a light, resilient pressure on the slidable member of the clutch. The platen may be freely rotated in either direction by the usual finger wheels 82 on the ends of the platen shaft.

The line-space-pawl 44 is provided with a rearwardly-extending finger-piece 48 for convenience in disengaging the pawl from the ratchet-wheel carried by the platen when the platen is rotated by hand for line-spacing.

This application is a substitute in part for my previously-filed copending application Serial No. 310,996, filed July 15, 1919.

What I claim is:

1. In a typewriting machine having a rotatable platen mounted on the carriage, means mounted on the carriage for rotating said platen embodying an interlocking-

member, a power-shaft and a motor for continuously driving it, actuating-means driven from the power-shaft to actuate the line-spacing means on the carriage embodying another interlocking-member, one of said interlocking-members consisting of a rail extending the length of travel of the carriage and the other interlocking-member consisting of an arm having continuous interlocking engagement with the aforesaid member, and key-controlled means for connecting the power-shaft to said actuating means.

2. In a typewriting machine embodying a motor and a shaft driven therefrom, a line-spacing mechanism adapted to be clutched to said shaft, key-controlled mechanism for operating said clutch, said clutch being a frictional one so as to adapt it to slip, a positive stop for the line-spacing mechanism being provided so that the clutch will slip after the line-spacing mechanism is operated its full throw.

3. In a typewriting machine, a continuously-driven power-shaft, a friction clutch on said shaft, key-controlled means for operating the line-spacing mechanism from this clutch embodying a pinion carried by one of the clutch-members and a pivoted segment in constant mesh with said pinion.

4. In a typewriting machine, a continuously-driven power-shaft and key-controlled means for operating the line-spacing mechanism of the machine from said power-shaft embodying a slip-clutch adapted to be put into operation and held in operation by the manual force applied to said key, whereby when the line-spacing operation is completed before the key is released a slippage may occur in the clutch, a pinion and segment mechanism operated by said clutch, and means for arresting the movement of the segment when the line-spacing action is completed.

5. In a typewriting machine embodying a carriage carrying a rotatable platen, means on the carriage for rotating the platen embodying a rail extending the length of travel of the carriage and mounted on arms extending upwardly and forwardly, actuating means for said line-spacing mechanism embodying a pivotally-mounted arm extending upwardly and forwardly in substantial parallelism with the arms carrying said rail and having continuous interlocking engagement with said rail, a continuously-running power-shaft and a motor for actuating the same, and key-controlled devices for connecting said power-shaft to said actuating means.

6. In a power typewriting machine, a line-spacing mechanism and a stop for arresting the same when it has operated its full throw, and power means for operating said mechanism embodying friction-slip driving-elements to permit the operating mechanism

to continue to rotate after the line-spacing mechanism has been arrested by said stop, and manually-controlled means for putting the friction-slip driving-elements into operation.

7. In a power-driven typewriting machine, a line-spacing mechanism embodying a ratchet device for rotating the platen, a rail-member extending the length of travel of the carriage, a roller-member adapted to relatively travel along said rail, a toothed segment linked to one of said members, a stop for limiting the throw of the segment on its actuating stroke, and manually-controlled power means for actuating said segment.

8. In a typewriting machine, power-operated key-controlled line-spacing mechanism embodying a rail on the carriage adapted to be swung upwardly and rearwardly, and means connected thereto for rotating the platen.

9. In a typewriting machine, power-operated key-controlled line-spacing mechanism embodying a rail movable upwardly and downwardly and supported entirely on the carriage, means connected to the rail for rotating the platen, and a device for actuating the rail having a roller adapted to travel along the rail, and a hook-member for interlocking with the rail, for the purpose set forth.

10. In a typewriting machine, a power-operated key-controlled line-spacing mechanism embodying a rearwardly-swinging arm carrying a roller, a movable rail on the carriage adapted to be engaged by said roller, means for interlocking the arm with the rail, and means connected to the rail for rotating the platen.

11. In a typewriting machine, a power-operated line-spacing mechanism embodying a key-controlled clutch for putting the mechanism into action, a segment adapted to be shifted by the driven member of the clutch and provided with a pair of separated stop-fingers, and a stop supported between said fingers.

12. In a typewriting machine, a power-operated line-spacing mechanism embodying a key-controlled clutch for putting the mechanism into action, a segment adapted to be shifted by the driven member of the clutch and provided with a pair of separated stop-fingers, and a stop supported between said fingers, said stop being carried by an arm adapted to be permanently bent for adjusting the stop.

13. In a typewriting machine, a power-operated line-spacing mechanism embodying a slip clutch, and key-means for putting said clutch into action embodying a key-lever, an intermediate lever actuated by said key-lever, and a resilient lever having one end in engagement with said intermediate

lever and its other end in engagement with the movable member of the clutch.

14. In a typewriting machine, power-operated line-spacing mechanism and key-controlled means for putting the same into action, said mechanism embodying a rockable horizontal shaft supported to the rear of the platen and having at one end an arm adapted to actuate the platen-rotating devices and having a depending arm at its other end adapted to be actuated by power.

15. In a typewriting machine, power-actuated line-spacing mechanism, a friction-slip clutch for putting the same into action, key-means for actuating this clutch, one member of said clutch being formed of separated edged members for the purpose of lightly scraping the friction-face of the opposite member.

16. In a typewriting machine, power-actuated line-spacing mechanism, a friction-slip clutch for putting the same into action, key-means for actuating this clutch, one member of said clutch being formed of separated portions having radial edges for the purpose of lightly scraping the friction-face of the opposite member.

17. In a typewriting machine, a continuously-running motor-driven shaft arranged transversely at the rear of the machine, clutch-members on said shaft, key-lever means for putting said clutch into action, line-spacing means operated from the driven member of said clutch, and means for stopping said line-spacing mechanism when the

spacing operation is completed irrespective of the relation of the clutch-members.

18. In a typewriting machine having a traveling carriage carrying a rotatable platen, a power-shaft journaled at the rear of the machine, a motor for continuously running said shaft, platen-rotating devices on the carriage, mechanism supported on the frame of the machine for operating the platen-rotating devices and having continuous connection therewith so as to be capable of rotating the platen in all positions of the carriage, devices for connecting said mechanism with the power-shaft in such manner as to actuate the same, and key-actuated means for putting said devices into action.

19. In a typewriting machine having a carriage carrying a roller-platen mounted on a pivoted frame capable of up and down movement for change in case, a line-spacing mechanism mounted on the carriage embodying a member pivoted co-axially with the pivot of said case-shifting frame and carrying at its upper end a pivoted pawl adapted to rotate the platen for line-spacing, an actuating mechanism having an up-standing member held in constant engagement with the member of the line-spacing mechanism, and key-controlled power mechanism for operating said actuating mechanism for causing a line-spacing rotation of the platen.

In testimony whereof I hereunto affix my signature.

MANSFIELD C. CRAWLEY.