July 29, 1924. 1,503,028

M. C. CRAWLEY

TYPEWRITING MACHINE

Original Filed Aug. 29, 1917 4 Sheets-Sheet 1

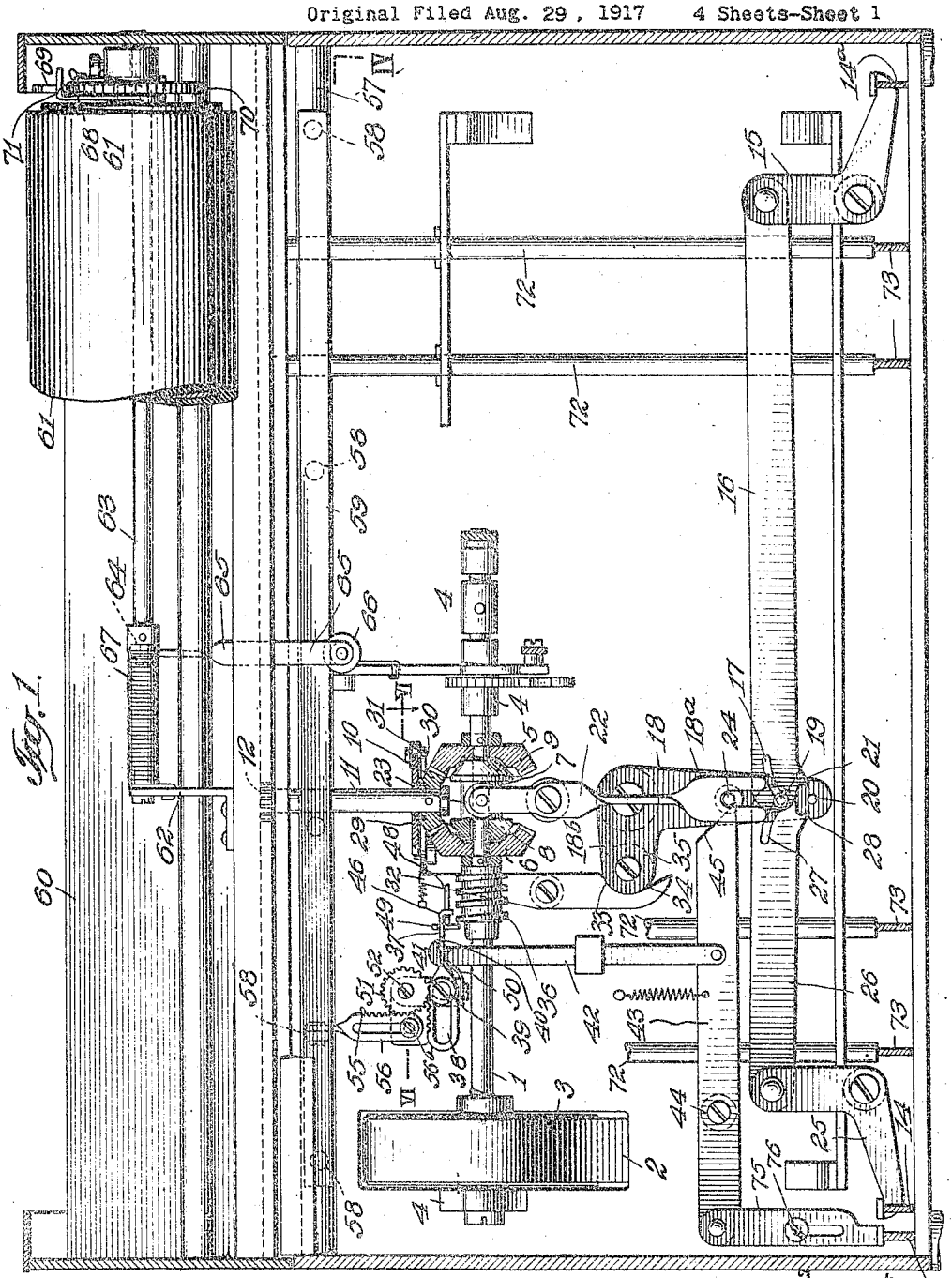


Fig. 1.

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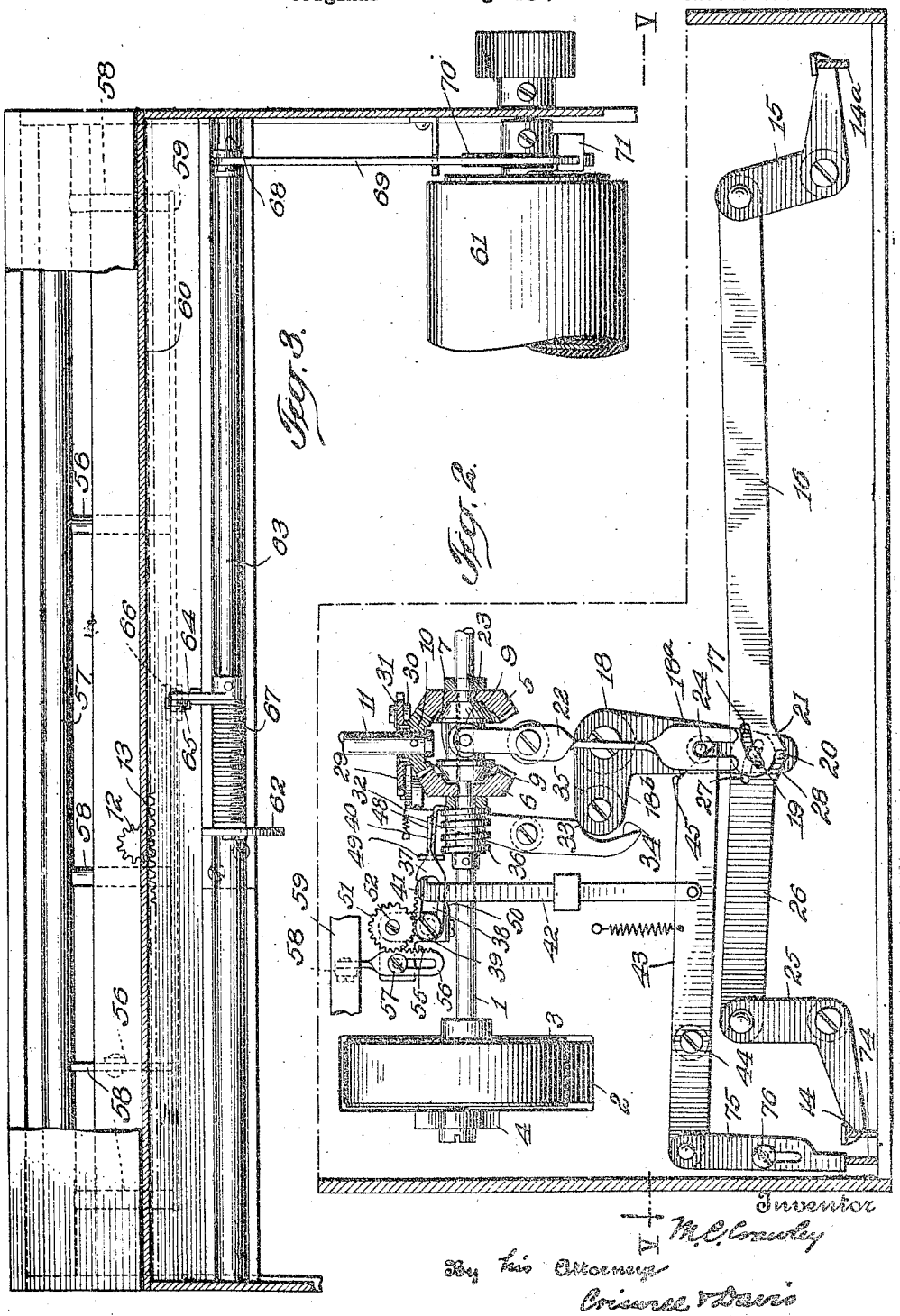


Fig. 3.

Fig. 2.

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TYPEWRITING MACHINE

Original Filed Aug. 29, 1917 4 Sheets-Sheet 3

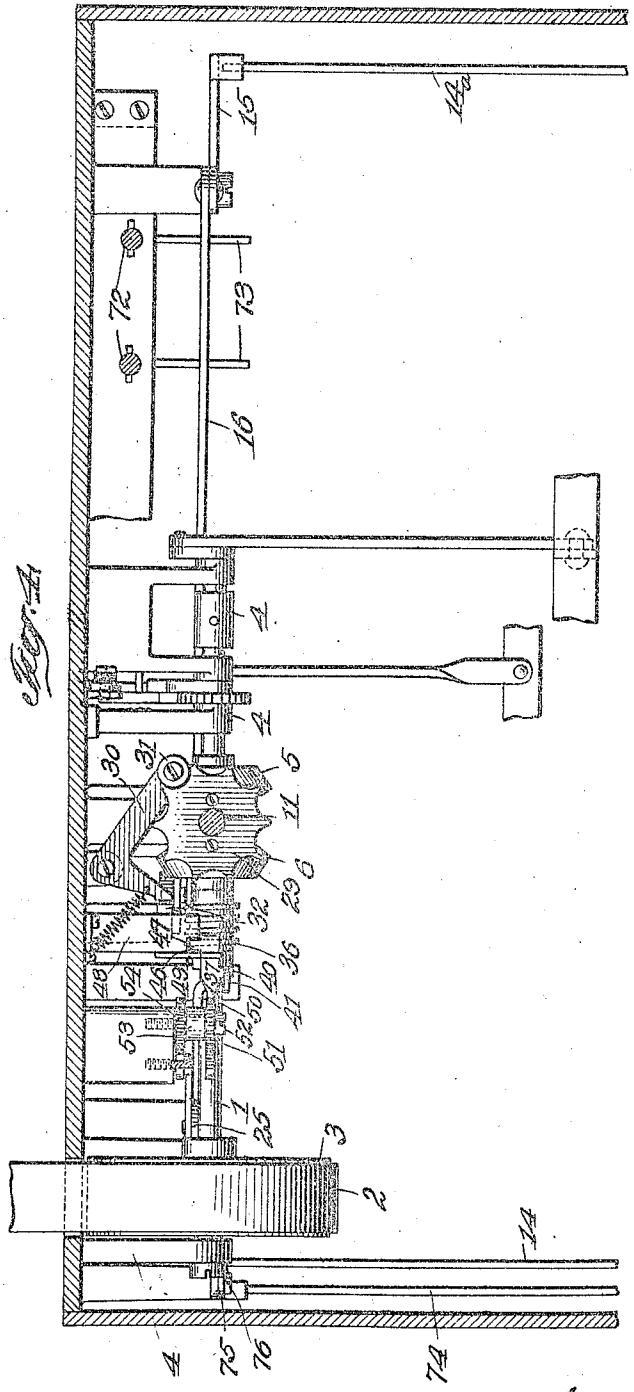


Fig. 4.

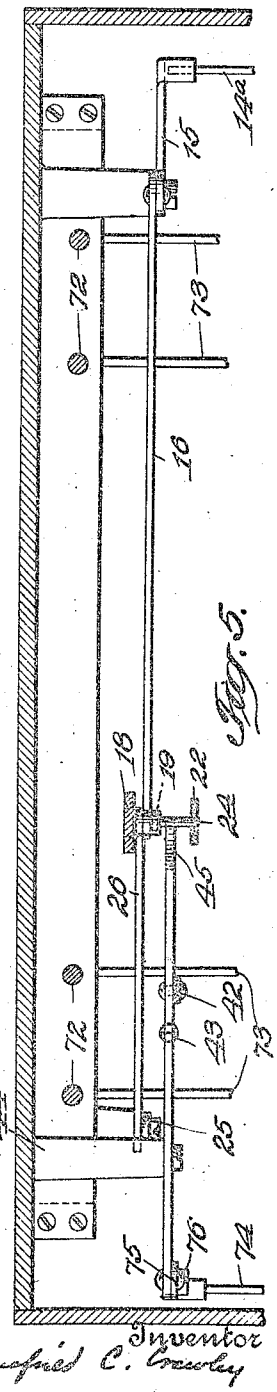


Fig. 5.

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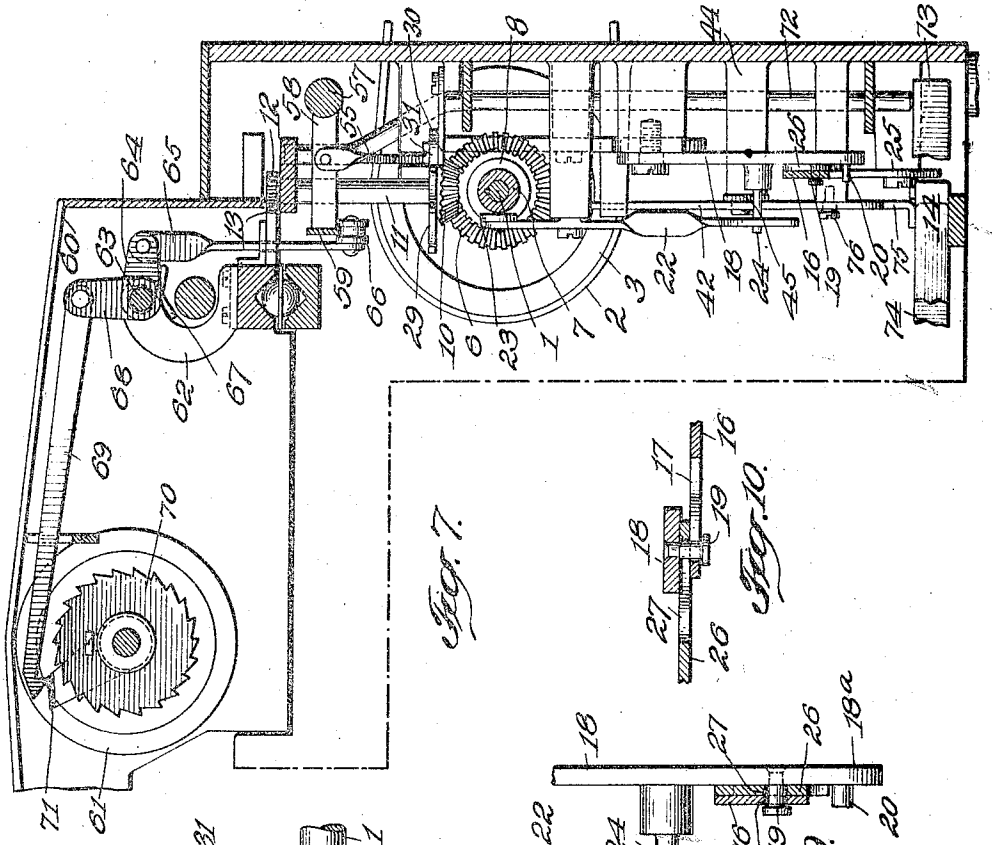


Fig. 7.

Fig. 10.

Fig. 9.

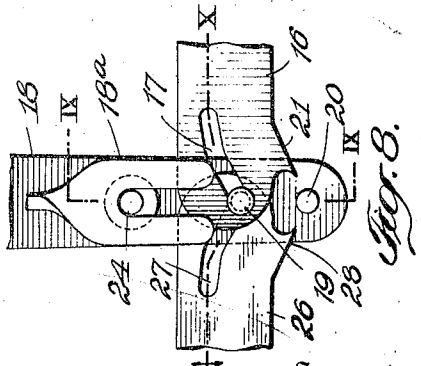


Fig. 8.

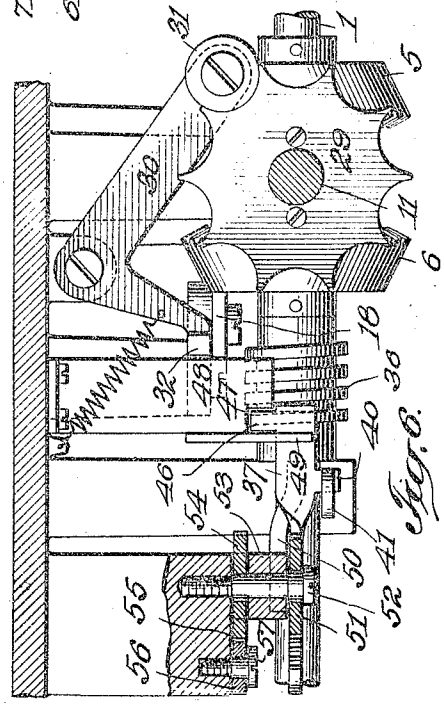


Fig. 6.

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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 August 29, 1917, Serial No. 188,772. Renewed October 2, 1922. Serial No. 591,989.

To all whom it may concern:

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

This invention relates to carriage and platen operating mechanism for writing machines, and has for its objects to provide a simple and efficient power-driven key-controlled means for imparting continuous running movements to a platen carriage either in normal letter-feed direction to rapidly advance the carriage or in the opposite direction to rapidly return the carriage, and to provide a simple and efficient power-operated line spacing mechanism so associated with said carriage running mechanism that the platen may be operated for line-spacing either automatically when the running mechanism is put into action to return the carriage or independently of the carriage running means.

In the drawings, Fig. 1 is a vertical transverse sectional view of a typewriting machine, taken on a line in the rear of the type segment, a portion of the carriage being shown in position in the frame.

Fig. 2 a view showing a part of the mechanism illustrated in Fig. 1, with the parts in position to shift the carriage to the right-hand side of the machine;

Fig. 3 a horizontal sectional view of a part of the carriage, showing the line spacing mechanism;

Fig. 4 a horizontal sectional view of the carriage frame, substantially on the line IV—IV of Fig. 1;

Fig. 5 a horizontal sectional view taken on the line V—V of Fig. 2;

Fig. 6 a horizontal sectional view on the line VI—VI of Fig. 1;

Fig. 7 a vertical sectional view showing the connection between the line-spacing mechanism and the carriage shift mechanism;

Fig. 8 a detail view of the connected ends of the levers and links which operate the carriage shifting means;

Fig. 9 a vertical sectional view on the line IX—IX of Fig. 8; and

Fig. 10 a horizontal sectional view on the line X—X of Fig. 8.

Referring to the various parts by numerals, 1 designates the drive shaft which is continuously operated by means of a suitable motor connected by belt 2 to the drive pulley 3. The drive shaft is suitably mounted in bearings 4 supported in the frame. Loosely mounted on the drive shaft, between spaced collars, are two oppositely beveled gears 5 and 6. Keyed to the shaft between said gears is a clutch head 7 which is provided at opposite ends with clutch members 8 and 9, said members being provided on their outer faces with beveled clutch surfaces which are adapted to engage corresponding surfaces formed on the inner faces of the beveled gears 5 and 6. Engaging the gears 5 and 6 is a beveled pinion 10 rigidly secured to the lower end of a vertical carriage driving shaft 11. On the upper end of said shaft is secured a carriage driving pinion 12 which is arranged to engage the carriage rack 13. It is manifest that by rotating the drive shaft 11 in the desired direction the carriage may be moved from side to side in the machine frame.

Suitably mounted in the machine frame are two key levers 14 and 14^a, one of said levers being arranged near each side of the machine. The rear end of lever 14^a engages the substantially horizontal arm of a bell-crank lever 15, pivoted in the main frame with its other arm extending upwardly from the pivot. Connected to this upwardly extending arm of the bell-crank lever is an inwardly extending substantially horizontal link 16, whose inner end is provided with the upwardly and outwardly inclined slot 17. Pivoted in the main frame directly below the carriage drive shaft 11 is a bell-crank main lever 18, one arm of which, 18^a, extends downwardly, the other arm 18^b extending horizontally substantially on a line with the pivot of the lever. The depending arm 18^a is provided with a forwardly extending horizontal pin 19 and said pin extends through the slot 17 in the link 16. The said arm 18^a of the bell-crank lever below the pin 19 is provided with a stop pin 20, which is adapted to be engaged by a hook-like shoulder 21, formed on the lower edge of the link 16, when said link is moved laterally through the bell-crank lever 15 and the key lever 14^a. In the main frame directly below the clutch head 7 is pivoted a

gear change lever 22 the upper end of which carries a roller 23 which engages the inner surfaces of the clutch members 8 and 9, as shown clearly in Figs. 1 and 2. The lower end of this gear changing lever is forked, and the arm 18a of the bell-crank lever 18 is provided with a forwardly extending pin 24, which fits between the arms of said fork, so that the said gear changing lever is swung on its pivot when the bell-crank lever 18 is moved. The key lever 14 engages the horizontal arm of a bell-crank lever 25, said lever being provided with an upwardly extending arm which is connected to an inwardly extending link 26. The link 26 is provided with a slot 27 which corresponds with slot 17 in the link 16; and the pin 19 extends through the slot 27 so that said pin projects through the slots of both links. The link 26 is provided at its lower edge with a downwardly extending shoulder 28 which corresponds with the shoulder 21 of link 16, and which is adapted to engage the stop pin 20 when the lever 14 is operated.

It is manifest that by operating the key lever 14a the link 16 will be moved inwardly and the slot 17 will guide the inner end of said link downwardly to cause the shoulder 21 to engage the stop pin 20. Further inward movement of the link 16 will then swing the bell-crank lever 18 on its pivot, causing the pin 24 to move the gear changing lever 22 and thrust the clutch member 9 into engagement with the clutch surface formed on the inner face of the gear 5, as clearly shown in Fig. 2 of the drawings. It is also manifest that by operating the key lever 14, the bell-crank lever 18 will be moved in the opposite direction through link 26, thereby bringing the clutch member 8 into engagement with the clutch surface formed on the inner face of the gear 6. As shown in Fig. 2, the shoulder on one link forms a stop to limit the movement of the bell-crank lever 18 and the other link.

On the carriage drive shaft 11 is mounted a star detent wheel 29, said wheel being rigidly secured to the beveled gear 10. Mounted on a suitable pivot is a detent bell-crank lever 30, one arm of which carries a roller 31 which is adapted to engage the teeth of the detent wheel. The other arm of said lever is in position to be engaged by the upper end of a release lever 32 pivoted in the main frame, the lower end of said lever being formed with the two cam surfaces 33 and 34 adapted to be engaged by a roller 35 mounted on the end of the arm 18b of the bell-crank lever 18. It is manifest that when the bell-crank lever 18 is swung on its pivot the release lever will be moved to swing the detent lever 30 and thereby release the roller 31 from the teeth of the detent wheel. The bell-crank lever moving in one direction will cause the roller 35 to engage the cam surface 33; moving in the opposite direction will cause the roller 35 to engage the cam surface 34, so that the release lever 30 will be swung on its pivot by the operation of either one of the key levers 14 or 14a. By releasing the roller 31 from the detent wheel the carriage drive shaft 11 will be free to rotate in either direction.

Rigidly secured to the drive shaft 1 is a worm 36. Above said worm and adapted to be drawn downwardly into engagement therewith is a line-space dog 37. The body portion of said dog is formed with a slot 38, through which extends a guide screw 39, said screw slidingly supporting the said dog. The dog 37 is formed with a forwardly extending lug 40 which is adapted to be engaged by a hook 41 formed on the upper end of a dog-operating link 42. The lower end of the link 42 is pivotally connected to a line-space lever 43 which is pivoted at 44 and is formed with the inclined cam surface 45 at its free inner end. The cam surface 45 is in position to be engaged by the pin 24 of the bell-crank lever 18 when the arm 18a of said lever is moved toward the left by means of the link 16. A downward movement of the line-space lever 43 moves the line-space dog into engagement with the worm 36 and through the movement of said dog the line-space devices are operated. The line-space dog 37 is formed with a rearwardly extending lug 46 which is adapted to be passed downwardly through a slot 47 formed in the forward edge of a guide plate 48, which is directly over the worm. The guide plate 48 is formed with a forwardly extending stop 49 which is adapted to be engaged by the line-space dog 37 when the said dog is in its normal at-rest position, as shown in Fig. 1. A spring 50 yieldingly holds the line-space dog against the stop 49, as shown clearly in Fig. 1. When the line-space dog is moved downwardly into engagement with the worm 36, the lug 46 passes below the guide plate 48 and the rotation of the worm then carries the dog toward the center of the machine, the lug 46 passing under the guide plate until the dog is freed from the worm, whereupon the spring 50 will lift said dog and cause the lug 46 to be elevated above the guide 48, whereupon it will be returned to its normal position over the top of said plate. In its return movement the lug 46 will contact with the stop 49 and the line-space dog will then be in position for the next line-spacing operation. The upper edge of the body of the line-space dog is provided with geared teeth to form a suitable rack, and said rack is in engagement with a pinion 51 mounted on a bearing screw 52. Rigidly connected to said pinion by means of a hub 53 is a pinion 54, which in turn meshes with a rack 55 formed on a slotted bar 56, which

is arranged vertically in the machine, as shown clearly in Figs. 1 and 2. This bar 56 is guided and supported in engagement with its pinion by means of a screw 56ª which passes through the said slot and into a permanent part of the machine frame. In the upper rear part of the machine frame is mounted a rock shaft 57 which is provided with a series of forwardly extending arms 58 which carry at their forward ends the line-space rail 59. The upper end of the slotted rack bar 56 is pivotally connected to one of said arms 58, so that upon the downward movement of said rack bar under the influence of its pinion 54, the line-space rail will be moved downwardly. The means for rotating the platen for line-spacing is connected to the line-space rail.

The platen carriage 60 supports the usual platen 61, said platen being mounted in any suitable form of bearings and in any suitable manner. The platen carriage may be of any suitable form, and may be arranged to travel transversely of the machine on any suitable form of carriage track. In the carriage and supported by suitable bearing brackets 62 is a transverse substantially horizontal rock shaft 63. Secured rigidly to said shaft and extending rearwardly therethrough is a crank arm 64, to which is connected a depending link 65 which carries at its lower end a grooved roller 66 which engages the lower edge of the line-space rail and travels along said rail as the carriage is moved transversely of the machine. Surrounding the rock shaft 63 is a coil spring 67, one end of said spring tending to lift the crank arm 64, the other end being connected to the rigid bearing brackets 62 so that the said spring normally tends to lift the crank arm 64 and through it the link 65 and the line-space rail 59. Secured rigidly to the rock shaft 63 near one end thereof is an upwardly extending crank arm 68, to the upper end of which is pivoted a forwardly extending pawl 69 which is adapted to engage the ratchet 70 mounted on the shaft of the platen. It is manifest that as the shaft 63 is rocked the pawl 69 will engage the ratchet 70 and rotate the platen for line spacing. To vary the extent of rotation of the platen through the operation of the pawl 69 an adjustable swinging guard plate 71 is provided, said plate being journalled on the platen shaft. It is manifest that by swinging the guard plate 71 under the pawl 69, the point at which the said pawl 69 will engage the ratchet 70 may be varied, thereby varying the number of spaces the platen will be rotated through the line-spacing means.

Mounted in the machine at the rear thereof and in proper position to be engaged by suitable stops on the carriage are carriage stops 72. To lift said stops in the position to be engaged by the stop on the carriage, keys 73 are provided. Any desired number of these stops may be used.

In order to operate the line-spacing devices independently of the carriage shifting devices, the line-space lever 43 is operatively connected to a line-space key 74 by means of a link 75, said link being guided by means of a pin-and-slot connection 76. It is manifest that by operating the line-space key 74, the line-spacing dog 37 will be depressed through the lever 43 and bar 42, and the platen rotated for line-spacing without operating the carriage shifting gears and without moving the carriage transversely of the machine.

From the foregoing it is manifest that the carriage may be moved in either direction to the desired predetermined stop, and that when moving the carriage toward the right-hand side of the machine, the platen will be rotated for line-spacing; but when moving toward the left-hand side of the machine the platen rotating means will be inactive and will not operate. It is also manifest that by operating the line-space key the line-space mechanism will be operated without shifting the carriage.

The line-spacing mechanism per se herein shown and described has certain features in common with the line-spacing mechanisms forming the subject matter of my Patents Nos. 1,469,774 and 1,469,776 dated October 9, 1923, wherein such common subject matter is broadly claimed. The present application is also subordinate to my Patent No. 1,459,777 dated October 9, 1923, wherein is shown a carriage and platen control mechanism, said patent containing broad claims to subject matter common to said patent and the present application.

What I claim is:

1. In a typewriting machine, a key-controlled power-driven line-spacing mechanism embodying toothed gearing held constantly in mesh, said gearing including a rack-bar actuated by the power, a gear driven thereby, another gear driven by the aforesaid gear, and another rack-bar actuated from this latter gear.

2. In a typewriting machine, the combination of a carriage, a rack, a carriage drive shaft, a pinion thereon meshing with said rack, a continuously operating main shaft, key-controlled means for connecting said main shaft with the carriage drive shaft to move the carriage in either direction, a worm mounted on the main shaft, line-spacing mechanism adapted to be connected to and operated by said worm, and means whereby said line-spacing mechanism will be connected to the worm when the carriage is moved in one direction.

3. In a typewriting machine, a key-controlled power-driven line-spacing mecha-

nism embodying toothed gearing held constantly in mesh, said gearing including a rack-bar and key-actuated means for temporarily connecting it to the power to thereby reciprocate it in one direction, a spring for returning this rack-bar, another reciprocating rack-bar connected to the platen-rotating means, and intermediate gears connecting the rack-bars.

4. In a typewriting machine, the combination of a carriage, a carriage drive shaft, means connecting the said shaft to said carriage, a continuously operating shaft, a gear changing lever, two keys, links interposed between the keys and the gear changing lever and adapted to move the said lever in opposite directions to connect the continuously operating shaft to the drive shaft.

5. In a typewriting machine, the combination of a carriage, a carriage drive shaft, means connecting the said drive shaft to said carriage, a continuously operating shaft, a pair of levers, a link connected to each of said levers, a bell-crank lever operatively engaged by said links, and means operated through said bell-crank lever for connecting the carriage drive shaft to the continuously operating shaft to move the carriage.

6. In a typewriting machine the combination of a carriage, a platen, a carriage drive shaft, means connecting the said shaft to said carriage, a continuously operating shaft, a line-space mechanism operable through said shaft for rotating the platen, a pair of levers, a link connected with each of said levers, a bell-crank lever independently operable through said links, and means operated by said bell-crank lever to connect the continuously operating shaft to the carriage drive shaft and to the line-spacing mechanism.

7. In a typewriting machine the combination of a carriage, a carriage drive shaft, means connecting the said shaft to said carriage, an operating shaft, a gear-changing lever, a detent to prevent the free rotation of the carriage drive shaft, a pair of key levers, a link connected to each of said levers, and means operatively connected to the links to operate the gear-changing lever to connect the carriage drive shaft to the operating shaft and to release the detent from the carriage drive shaft.

8. In a typewriting machine the combination of a carriage, a carriage moving means, a pair of key levers, a link connected to each of said levers, each of said links serving as a stop to limit the movement of the other link, and means operatively connecting each of said links to the carriage moving means.

9. A line-spacing device for a typewriting machine comprising a platen, a line-space bar, means connected to said bar and movable longitudinally thereof for rotating the platen for line-spacing, a continuously operating shaft, a worm thereon, a dog adapted to move longitudinally of the shaft, key-operated means for moving said dog into engagement with said worm, and rack and pinion devices connecting said worm with said line-space bar.

10. A line-spacing device for a typewriting machine, comprising a platen, a line-space bar, means connected to said bar for rotating the platen for line-spacing, a continuously operating shaft, a dog adapted to be moved longitudinally of the shaft, and rack and pinion devices connecting said dog with the line-space bar.

11. A line-spacing device for a typewriting machine, comprising a platen, a line-space bar, means connected to said bar for rotating the platen for line-spacing, a continuously operating shaft, rack and pinion devices connected to said bar, key-actuated means for connecting said rack and pinion devices to the continuously operating shaft, and means for maintaining said connection for a predetermined period.

12. In a typewriting machine, a power-driven carriage-running mechanism including a clutch-shifting lever and a locking device for said mechanism, a main lever and two independent key-actuated means for shifting said main lever respectively in opposite directions, and means whereby the movement of this main lever is caused to actuate said clutch lever and also said locking device.

13. In a typewriting machine, a power-driven mechanism for giving the carriage a running movement embodying a clutch-shifting lever and a gear-locking device, a main lever and two key mechanisms for independently actuating this main lever in opposite directions, means connecting this main lever with the clutch-shifting lever, and another lever for unlocking the locking devices actuated by said main lever.

This specification signed this twenty seventh day of August, A. D. 1917.

MANSFIELD C. CRAWLEY.