

Jan. 5, 1937.

J. F. KOCA

2,066,978

CARRIAGE RETURN

Filed March 2, 1933

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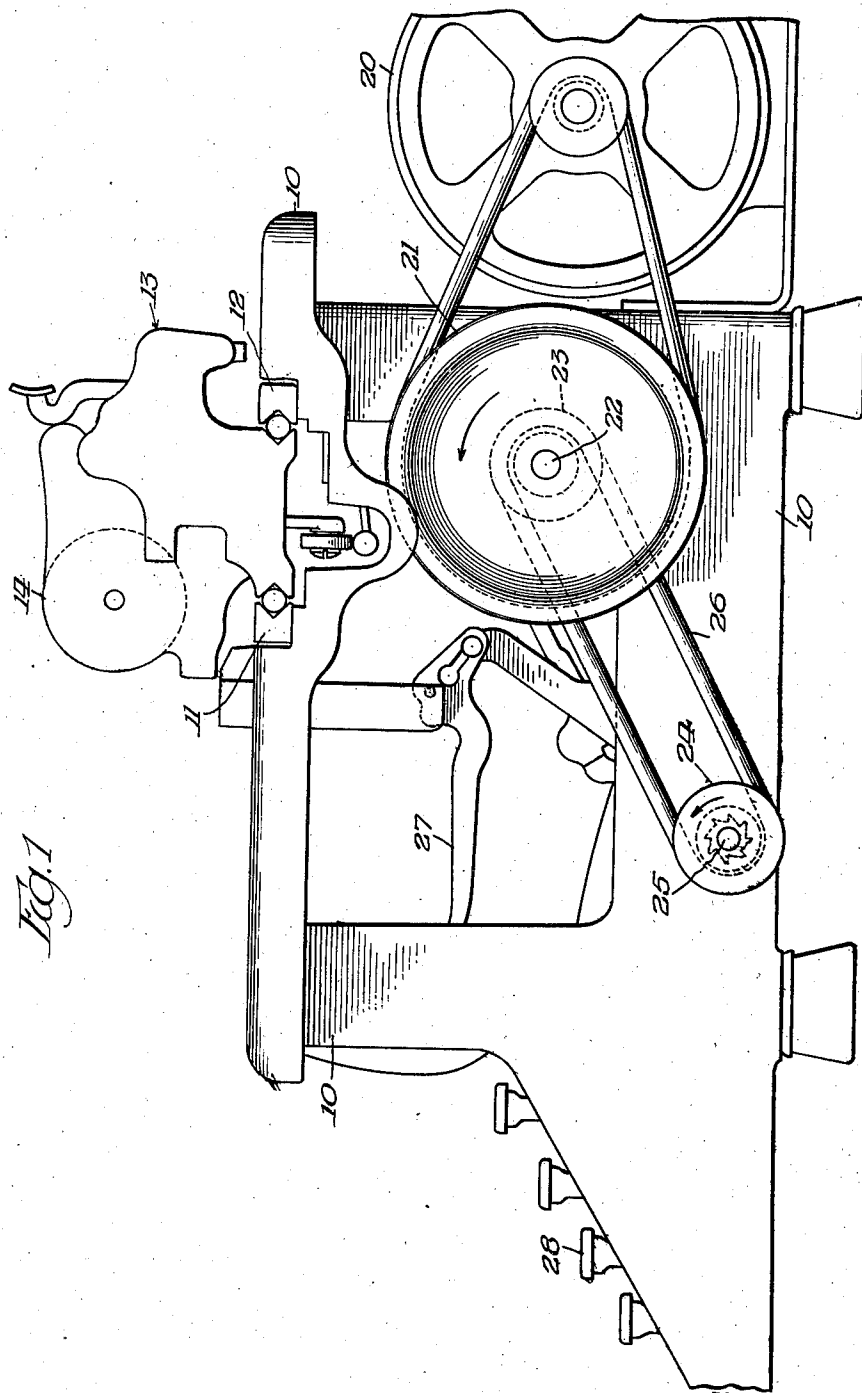


Fig. 1

By

Inventor
JAMES F. KOCA

Cox & Moore Attys

Jan. 5, 1937.

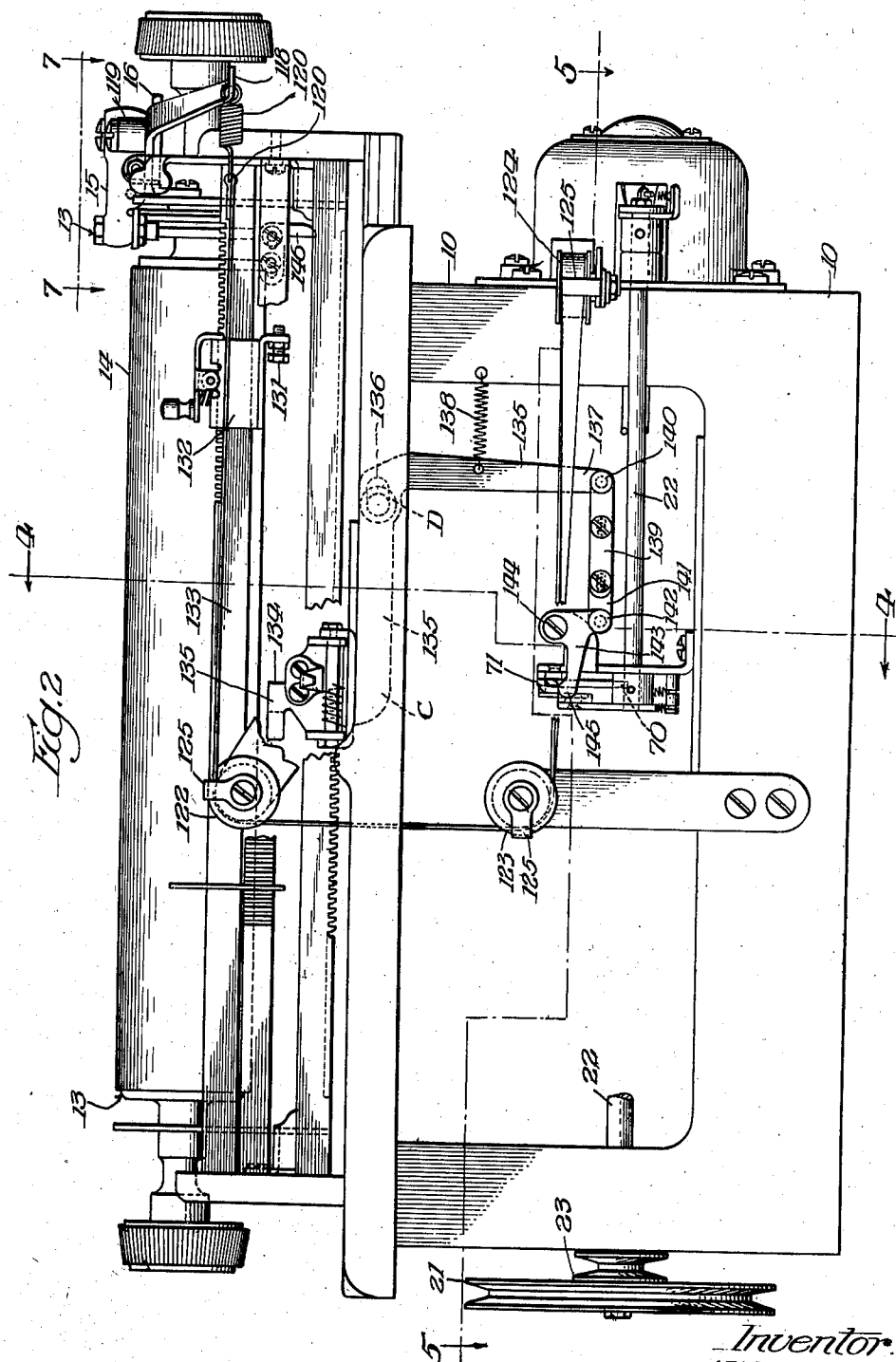
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Inventor
JAMES F. KOCA
By Cox & Moore Attys

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J. F. KOCA

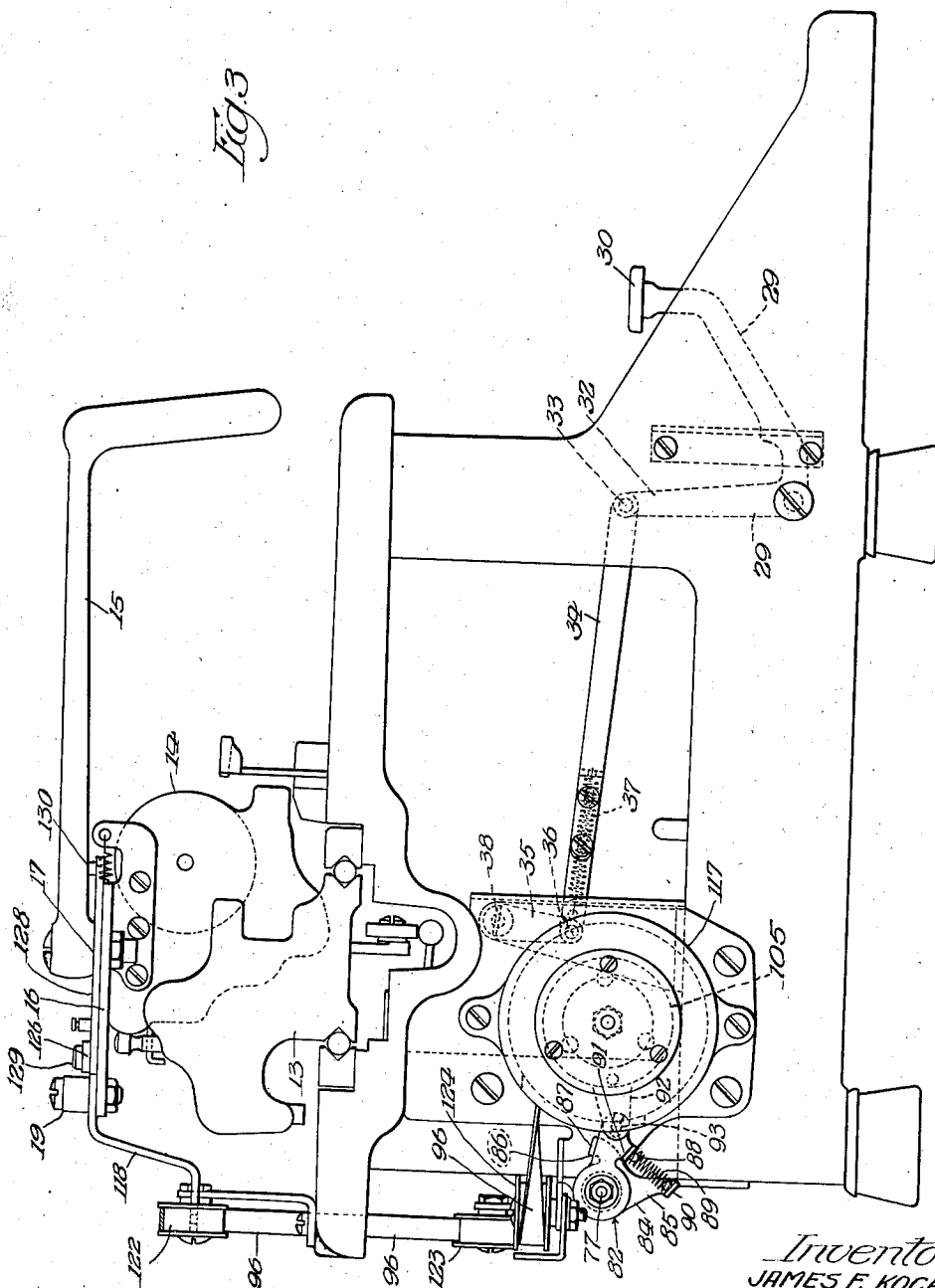
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Fig. 3



Inventor:
JAMES F. KOCA

By Cox & Moore *Attys*

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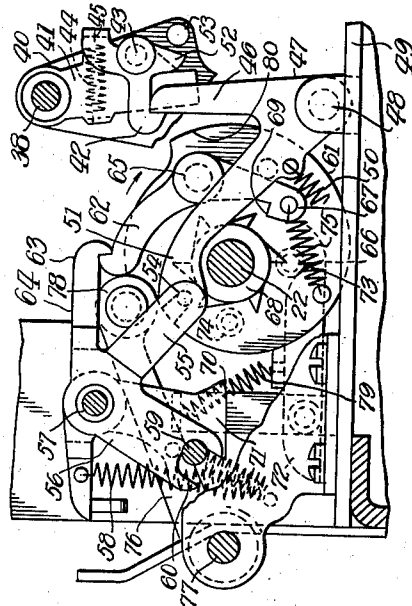


Fig. 4a

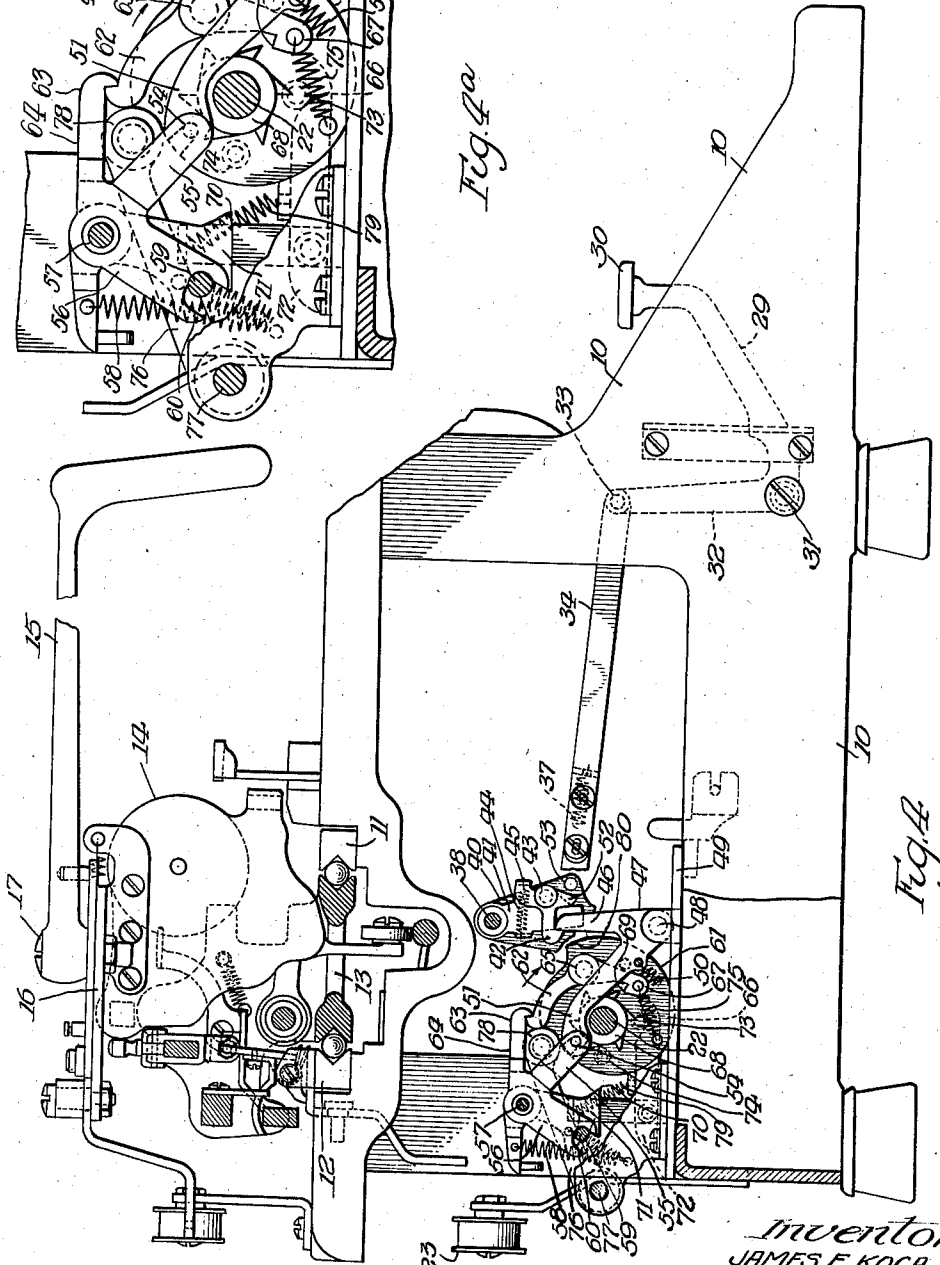


Fig. 4b

inventor
JAMES F. KOCA
By Cox & Moore Attys

Jan. 5, 1937.

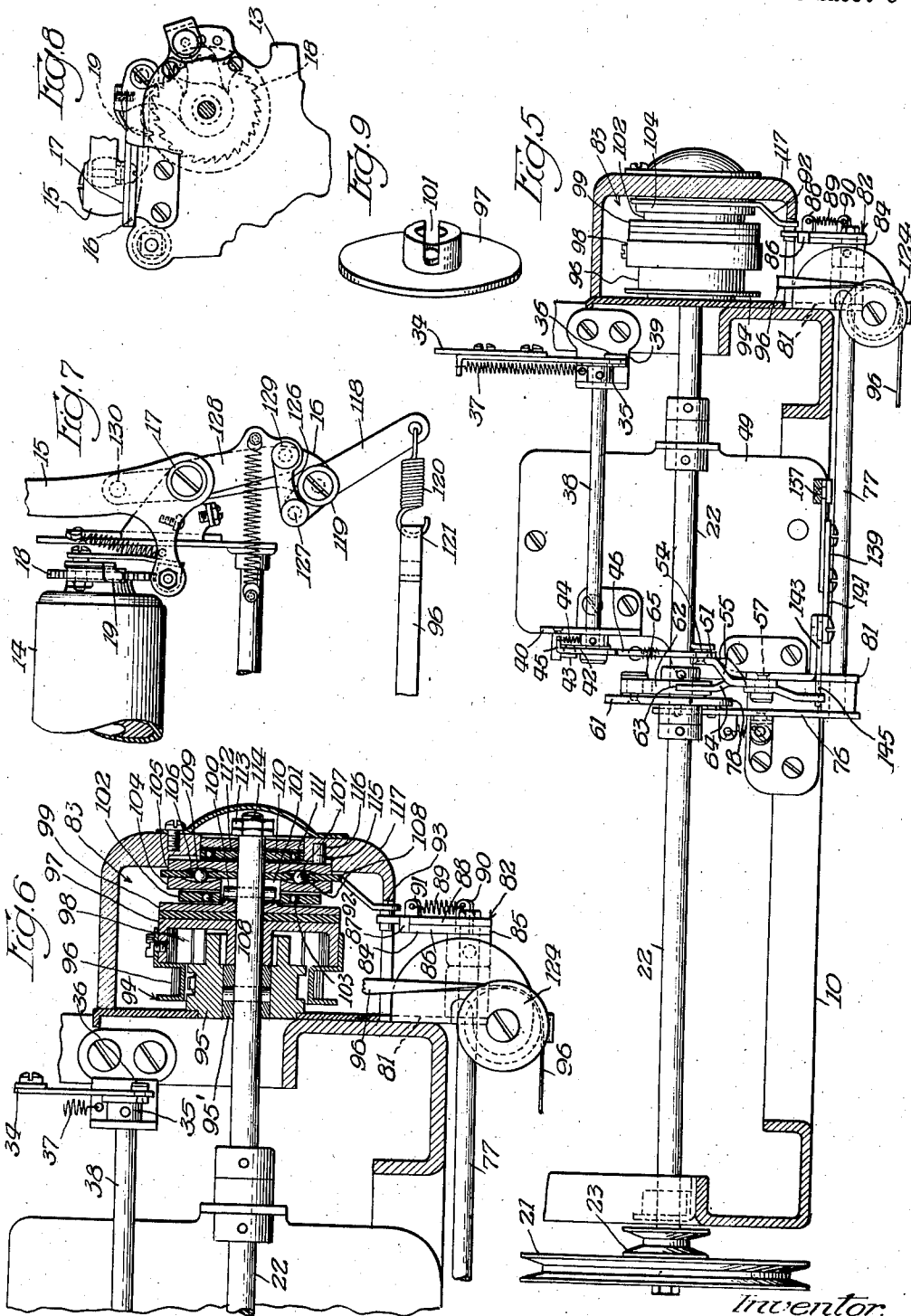
J. F. KOCA.

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CARRIAGE RETURN

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5 Sheets-Sheet 5



By

Inventor:
JAMES F. KOCH
Cox & Moore Attys

UNITED STATES PATENT OFFICE

2,066,978

CARRIAGE RETURN

James F. Koca, Woodstock, Ill., assignor to Woodstock Typewriter Company, Woodstock, Ill., a corporation of Illinois

Application March 2, 1933, Serial No. 659,332

11 Claims. (Cl. 197—66)

This invention relates to typewriters and particularly to electrically operated carriage return mechanism. More specifically the invention relates to an electric carriage return for electrically operated typewriters.

The primary object of the present invention is to provide new and improved means for electrically returning the carriage to marginal position by the pressing of a single key lever.

Another object of the invention is to provide a novel carriage return mechanism for returning the carriage and advancing the line spacing by rotation of the platen, all of which occurs automatically upon the pressing of a single key lever.

A further object is to provide simple, efficient, and positive operating mechanism for returning the carriage and line spacing the platen.

A still further object is to provide a new and novel arrangement of parts, including clutch mechanism and means connected to the line space lever for returning the carriage and moving the platen to line spaced position in a continuous operation by the manual manipulation of a single key lever.

Numerous other objects and advantages will be apparent throughout the progress of the following specification.

The accompanying drawings illustrate a selected embodiment of the invention and the views therein are as follows:

Fig. 1 is an end elevation of the right side of an electric typewriter, and embodying the invention.

Fig. 2 is a detail rear elevation partly in section.

Fig. 3 is an end elevation of the left side of the typewriter.

Fig. 4 is a detail sectional view on the line 4—4 of Fig. 2.

Fig. 4A is an enlarged detail view of some of the mechanism shown in Fig. 4.

Fig. 5 is a detail plan section on the line 5—5 of Fig. 2.

Fig. 6 is a detail plan section similar to Fig. 5 but on an enlarged scale.

Fig. 7 is a detail plan view partly in section looking in the direction of the arrows 7—7 of Fig. 2.

Fig. 8 is a detail end elevation of some of the parts shown in Fig. 7.

Fig. 9 is a detail perspective view of a clutch driving member.

The typewriter to which the invention pertains has a frame 10 which supports the front and rear carriage rails 11 and 12 respectively, Fig. 4, upon

which the carriage 13 is slidably supported. The particular typewriter herein shown is a "Woodstock" typewriter and, in general, the parts including the frame, type bars, platen, hand carriage return and others are standard with Woodstock machines and the various parts will not be described except in conjunction with those required for electrically operating the carriage.

The typewriter has a platen 14, which is supported on the carriage 13, and may be manually operated by a line space lever 15 which is pivotally mounted on a part 16 of the carriage frame as indicated at 17, Figs. 3, 7 and 8. This lever is for the purpose of returning the carriage manually, as well as rotating a ratchet wheel 18 fixed to the platen 14, Figs. 7 and 8, to line space the platen. A pawl 19 is operatively connected to the lever 15 to rotate the ratchet wheel 18 upon manipulation of the lever, in the usual conventional manner. The usual tabulator mechanism operated by a tabulator key not shown, but which is conventional on Woodstock typewriters, is employed for the usual purpose of shifting the carriage to the left, cooperating with certain tabulator stops on a tabulator bar. The construction and arrangement of the tabulator mechanism used in connection with the present typewriter is also conventional with Woodstock typewriters and constitutes no part of the present invention. However, in applicant's copending application, Serial No. 659,334, filed concurrently herewith, there is shown tabulator mechanism which is electrically operated and controlled.

A motor 20 is connected to the frame 10 and drives a pulley 21 fastened on a shaft 22. A pulley 23 on the shaft 22 drives a pulley 24 on the drive shaft 25 through the intermediary of a belt 26. The drive shaft 25 is engaged by actuator levers to move the type bars 27 to impression position when the key levers 28 are depressed.

A key lever 29, to operate the carriage return mechanism upon depression of a key 30, is pivoted to a part of the frame as indicated at 31. This key lever 29 has a rigid extension or tail piece 32 which is pivoted at 33 to an adjustable link 34 which has its free end pivoted to an arm 35 as indicated at 36, Fig. 3. A spring 37 is fastened to the link 34 and to a bracket fastened to the frame of the typewriter to pull the link 34 to the left, Figs. 3 and 4, and consequently hold the key lever 29 in up or normal operating position. The upper end of the arm 35 is fixed to a rock shaft 38, and oscillates about its axis upon upward or downward movement of the key lever. The rock shaft 38 is journaled in brackets 39 and

40, Figs. 4 and 5. An arm 41 is fixed to the rock shaft 38 and carries a pawl 42 which is pivoted thereto as indicated at 43. A spring 44 holds the pawl 42 in a predetermined position and urges the pawl downwardly toward locked or latched position. An arm 45 on the pawl 42 limits the pivotal movement of the pawl relative to the arm 41. The pawl 42 engages an arm 46 of a bell-crank 47 which is pivoted at 48 to a base plate 49. A spring 50 is connected to the arm 51 of the bell-crank 47 and urges the bell-crank so that the arm 46 will be normally held against the pawl 42. Upon depression of the key lever 29, the rock shaft 38 is moved in a counter-clockwise direction. This movement causes the latch or pawl 42 to swing the bell-crank 47 in a clockwise direction. A tail-piece 52 on the pawl 42, during rocking movement of the shaft 38, engages a pin 53 on the bracket 40 and causes the pawl 42 to become released from the arm 46 of the bell-crank 47 after the bell-crank has been swung on its pivot a predetermined amount. The arm 51 of the bell-crank 47 has a pin and slot connection as indicated at 54 with an arm 55 of a latch member 56. The latch 56 is pivotally mounted on a stud shaft 57, being held by the spring 58 which normally urges the tail-piece of the latch 56 downwardly. A pin 59 engages a slot 60 and limits the rocking movement of the latch member 56.

A cam 61 is freely and revolvably mounted on the drive shaft 22 and carries a pawl 62 which is adapted for intermittent engagement with a pawl 63 on an arm 64 of the latch member 56. The pawl 62 is pivoted to the cam 61 as indicated at 65, there being a spring 66 on the tail-piece 67 of the pawl 62 to urge the pawl 62 in a predetermined direction and normally into locked engagement with the pawl 63.

A ratchet 68 is fixed to the shaft 22 and is adapted for complementary or locking engagement with a locking tooth 69 of the pawl 62. Therefore, upon depression of the key lever 29, the rock shaft 38 will cause the pawl 42 to pull the arm 46 and rotate the bell-crank 47 on its pivot 48 in a clockwise direction and release the pawl 63 from the pawl 62 and cause engagement of the locking tooth 69 with a ratchet on the member 68. This operation locks the cam 61 to the shaft 22 and causes the cam to rotate with the continuously rotating shaft 22. As the pawl 62 is fixed to the cam 61, the pawl 62 will rotate with the cam until the pawl 62 engages a projection 70 on a latch 71. During the pressure on key lever 29 at the end of the stroke, the tail-piece 52 of the latch or pawl member 42 will become engaged with the pin 53 causing the pawl 42 to become disengaged from the arm 46 of the bell-crank 47 and returning the parts to their original normal position. The cam 61, therefore, will rotate with the shaft 22 approximately three-quarters of a turn until the pawl 62 engages the projection 70 at which time the cam will come to rest by pulling the tooth 69 from engagement with the ratchet member 68. To assist in holding the cam in this latter position, a detent 72 having a dip or recess 73 is adapted for engagement with a pin or projection 74 on the cam 61. This rotation of the cam operates mechanism for line spacing the platen and for returning the carriage. As soon as this latter operation is completed, the latch member 71 is operated to release the pawl 62 from the projection 70 and the cam will again rotate and return the parts into locked position as shown in Fig. 4. A sec-

ond pin or projection 75 is carried by the cam 61 and engages the dip or recess 73 in the detent 72 for assisting in maintaining the parts in their normal locked position as shown in Fig. 4.

An arm 76, fixed to a shaft 77, carries a cam follower 78 which rides on the periphery of the cam 61. A spring 79 is fastened to the arm 76 to hold the cam follower against the periphery of the cam 61. Therefore, when the cam follower 78 strikes the high part 80 of the cam 61, the shaft 77 will be moved in a counter-clockwise position. This shaft is revolvably mounted in supporting brackets or ears 81, Fig. 5, and carries a clutch operating member 82, Figs. 5 and 6, for operating clutch mechanism 83.

Clutch operating mechanism

The clutch operating member 82 comprises a fixed bell-crank 84 having arms 85 and 86, Fig. 3. The arm 86 has a lip 87 bent therefrom which is adapted to engage an arm 88 which is pivoted to the shaft 77, being normally held against the lip 87 by a spring 89 which is fastened to the arm 85 as indicated at 90, and which is fastened to a lip 91 bent from the arm 88. The arm 88, therefore, is resiliently connected to the bell-crank 84 by means of the spring 89. This construction provides a flexible connection between the two parts to provide a positive but flexible clutch operating means.

The clutch 83 is operated by a member 92 which has a pivotal engagement with the arm 88 as indicated at 93.

Clutch

The clutch 83, Figs. 5 and 6, comprises a reel 94 revolvably mounted on the shaft 22 which passes through a journal 95, and this reel 94 is adapted to carry winding tape 96. A sleeve 95' is fixed to the shaft 22 and constantly rotates therewith and forms a driving face for other parts of the clutch mechanism. The reel 94 is fixed to a member 97 which carries a coil spring 98 one end of which is attached to the boss or journal 95. The member 95 is a stationary stud and the member 97 is freely mounted on the shaft 22. Therefore, there is some tension on the spring at all times. The connection of the spring to the stud 95 and to the reel 97 is for the purpose of taking up the slack in the tape 96, particularly when the carriage is operated by hand without the use of the electrical mechanism for operating the carriage return. This connection has no bearing as far as the electrical operation of the machine is concerned.

The spring cannot become damaged because the rotation of the reel is limited by the movement of the carriage. A driving member 99 is fixed to the shaft 22 by means of a pin 100 passing through aligned holes in the integral boss 101 on the driving member and through the shaft 22, Fig. 9. This driving member, therefore, has a driving connection with the shaft 22 and constantly rotates therewith, there being a friction disc freely mounted on the shaft and interposed between the member 97 and the driving member 99. A ball retainer 102 carrying circumferentially spaced balls 103 is interposed between the driving member 99 and the clutch plate 104. The member 92 includes a circular portion 105 which is arranged between the clutch plates 104 and 106 and is provided with openings in which balls 107 are arranged. These balls 107 are adapted to fit into the cooperating countersinks or sockets 108 and 109 in the opposing faces of the clutch mem-

bers 104 and 106 respectively. A thrust bearing retainer 110 having balls 111 contacts with the outer face of the clutch plate 106, and an end thrust bearing plate 112 contacts with the retainer 110. Nuts 113 are threaded on the end 114 of the shaft 22. A pin 115 is fixed to the clutch plate 106 and enters a recess 116 in the clutch housing 117. The housing 117 is fixed to the frame 10. Therefore, when the clutch operating mechanism 82 is operated by movement of the shaft 77, the operating member 92 including the circular portion 105, will be given rotative movement and spread the clutch plates 104 and 106 apart and frictionally lock the parts 97, the friction disc, and part 99 between the clutch plate 104 and sleeve 95' and cause these members to rotate with the shaft 22. Therefore, when the key lever 29 is depressed, the cam 61 will rotate with the shaft 22 and cause the arm 76 to rotate with the shaft 22 and cause the arm 76 to rotate the shaft 77 a partial turn causing the member 92 to operate the clutch mechanism 83 and positively wind the tape 96 on the reel 94.

Carriage return and line spacing

The tape 96 has one end fixed to the reel 94 and its other end fixed to an arm 118 which is pivotally supported by the plate 16 as indicated at 119, Figs. 2 and 7. There is a spring 120 interposed between the arm 118 and the free end 121 of the tape. The tape passes around rollers 122, 123 and 124, there being supporting lips or fingers 125 adjacent the periphery of each roller to prevent the tape from falling off or slipping from the rollers or pulleys.

The coil spring 98 is tensioned sufficiently to wind the tape when the carriage is returned by hand, and normally tends to keep the tape sufficiently taut. A link 126 is pivotally connected to the arm 118 as indicated at 127 and pivotally connected to an arm 128 as indicated at 129. The arm 128 has a fixed connection with the lever 15 as indicated at 130. Therefore, when the tape is being wound, upon operation of the clutch, the arm 118 will be pulled to the left, Fig. 7, move the lever 15 to rotate the platen and then pull the carriage back to marginal position. Thus, when the key lever 29 is depressed, the cam will rotate a predetermined distance with the drive shaft 22 and operate the arm 76, rock the shaft 77 to cause operation of the clutch 83 which will wind the tape 96, and cause the platen 14 to be rotated, and the carriage 13 to be shifted to marginal position.

Clutch disengaging means

Means are required to cause disengagement of the clutch at the proper time which is at the end of the carriage return. This clutch disengagement means includes a stop 131, Fig. 2, on the margin stop 132 which is adjustably mounted on the margin bar 133. The carriage 13, as it is moved to return position and which carries the margin bar 133 and its stop 132, will engage the face 134 of the lever 135 and move the lever 135 in the same direction as the carriage is traveling. The engagement of the stop 131 with the lever 135 moves the lever 135 a distance equal to the length of the slot 136, Fig. 2, and moves the end 137 of the lever 135 to the left against the tension of the return spring 138. An adjustable link 139 is connected to the end 137 of the lever 135 as indicated at 140. The forward end 141 of the link 139 is pivotally connected at 142 to a bell-crank 143 and swings the bell-crank 143 on its pivot 144 in a clockwise direction causing the

end or kick-off lever 145, Fig. 2, to move upwardly and disengage the projection 70 of the latch member 71 and swing the latch 71 on its pivot 57 and release the engagement of the pawl 62 from the projection 70. Therefore, the parts will again return to normal position as shown in Fig. 4, and allow the arm 76 to return to initial position and permit shaft 77 to release the clutch operating mechanism.

In cases where the margin stop 132 is omitted, or in cases where the margin stop is positioned inwardly from the end of the machine, a stop 146 may be fastened to a part of the carriage to engage the surface 134 of the lever 135 to release the clutch mechanism. Therefore, the arm 146 performs the same function as the member 131 on the margin stop 132.

Operation

The operation of the device is as follows: When the key 30 is depressed to operate the key lever 29, the adjustable link 34 will be moved to the right, Fig. 3, causing the shaft 36 to rock and permit the arm 46 of the bell-crank 47 to move in a clockwise direction, to the right, Fig. 4, when the pawl 42 will become released from the end of the arm 46. As soon as the arm 46 is released from the pawl 42, the pawl 62 will be released from the pawl 63 and the latching end 69 of the pawl 62 will be engaged by a tooth of the rotating ratchet 68. The cam, therefore, will be locked to the shaft 22 and rotate with the shaft. However, as soon as the pawl 62 reaches a predetermined position, it will become engaged with the projection 70 on the latch member 71 and release the latching end 69 from a tooth on the ratchet member. Therefore, the cam will no longer rotate with the shaft 22. During rotation of the cam 61, the cam follower 78 will cause the arm 76 to give the shaft 77 a part turn. The shaft 77 operates the clutch operating mechanism 82 which, through the member 92 and its associated piece 105, will operate the clutch 83 causing the tape 96 to wind on the reel 94, line space the platen, and return the carriage to initial marginal position. At the end of the marginal position of the carriage, either stop 131 or 146 will engage the face 134 on the lever 135, rock the member 143 and cause the member 145 to move the latch 71 and release the pawl 62 from the projection 70. As soon as the latch 71 is moved, the latching end 69 of the pawl 62 will again become engaged with a tooth on the ratchet member and again cause reversible movement of the cam until the pawl 62 will engage the pawl 63 at which time the parts will be in their initial normal position as shown in Fig. 4.

The invention provides efficient, positively operating, relatively simple, electrically operated means for line spacing the platen and returning the carriage to marginal position. The parts are compact and become engaged and disengaged in proper sequence to effect proper operation of the carriage and the line spacing mechanism at the proper time. The individual shaft for the operating mechanism permits the devices and parts constituting the invention to be timed to the best practical advantage without paying any attention or heed to the operation of the drive shaft which operates the type bars and, therefore, operates the type bar action from the carriage operating mechanism.

Changes may be made in the form, construction, and arrangement of the parts without de-

parting from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. In an electric typewriter, a power drive shaft, a cam freely mounted on the shaft, a carriage return key lever, mechanism controlled by the key lever for locking the cam to the drive shaft when the key lever is depressed, a clutch on the shaft, means operated by the cam for locking the clutch to the shaft during depression of the key lever, a carriage, a platen carried by the carriage, a lever carried by the carriage and cooperating with the platen to line space the platen and return the carriage, a reel carried by the clutch and controlled thereby, a tape member fastened to the reel and to the lever and operating the carriage and platen when the key lever is depressed, and a spring cooperating with the reel to take up slack in the tape.
2. In an electric typewriter, a power drive shaft, a cam freely mounted on the shaft, a carriage return key lever, mechanism controlled by the key lever for locking the cam to the drive shaft when the key lever is depressed, a clutch on the shaft, means operated by the cam for locking the clutch to the shaft during depression of the key lever, a carriage, a platen carried by the carriage, a lever carried by the carriage and cooperating with the platen to line space the platen and return the carriage, a reel carried by the clutch and controlled thereby, a tape member fastened to the reel and to the lever and operating the carriage and platen when the key lever is depressed, a spring cooperating with the reel to take up slack in the tape, and means for returning the parts to initial position after the platen has been line spaced and the carriage returned.
3. In an electric typewriter, a power drive shaft, a clutch member adapted to be driven by the shaft, a carriage adapted to be operated by said clutch member, means for normally holding the clutch member out of operative engagement with the shaft, a cam freely mounted on said shaft, a key lever, means controlled by the operation of the key lever to lock the cam to the shaft, means for unlocking the cam from the shaft when the cam has rotated part of a revolution, and means controlled by the cam when it has traveled said part revolution to cause the clutch member to be driven by the shaft whereby to operate said carriage to marginal position, means controlled by the carriage when it has moved to marginal position to cause the cam to be again locked with the shaft and rotate therewith a partial turn to initial position, and means for unlocking the cam from the shaft when the cam has returned to initial position.
4. In an electric typewriter, the combination of a shaft, means for driving said shaft, a clutch member adapted to be driven by said shaft, a carriage adapted to be operated by said clutch member, means for normally holding the clutch member out of operative driving relation with said shaft, an instrumentality mounted on said shaft, a key lever, means controlled by the operation of the key lever to lock said instrumentality to the shaft, means for unlocking the instrumentality from said shaft when the instrumentality has rotated a part revolution, means controlled by the instrumentality when it has traveled said part revolution to cause the clutch

member to be driven by the shaft whereby to operate the carriage to marginal position, and means controlled by the carriage when it has moved to marginal position to cause the instrumentality to again be locked with the shaft and rotate therewith a partial turn to initial position.

5. In an electric typewriter, the combination of a shaft, means for driving said shaft, a clutch member adapted to be driven by said shaft, a carriage adapted to be operated by said clutch member, means for normally holding the clutch member out of operative driving relation with said shaft, an instrumentality mounted on said shaft, a key lever, means controlled by the operation of the key lever to lock said instrumentality to the shaft, means for unlocking the instrumentality from said shaft when the instrumentality has rotated a part revolution, means controlled by the instrumentality when it has traveled said part revolution to cause the clutch member to be driven by the shaft whereby to operate the carriage to marginal position, means controlled by the carriage when it has moved to marginal position to cause the instrumentality to again be locked with the shaft and rotate therewith a partial turn to initial position, and means for unlocking said instrumentality from the shaft when said instrumentality has returned to initial position.

6. In an electric typewriter, a power drive shaft, a first clutch member, a key lever, means controlled by the key lever for operatively connecting the drive shaft with the first clutch member whereby to cause the drive shaft to drive said first clutch member, a second clutch member, means controlled by the first clutch member to cause the second clutch member to be driven by the shaft, a carriage, means for laterally shifting and line spacing the carriage driven by said second clutch member, and means controlled by the carriage as it is shifted to a predetermined position for further controlling the operative connection of the first clutch member with the drive shaft.

7. In an electric typewriter, a power drive shaft, a first clutch member, a key lever, means controlled by the key lever for causing the drive shaft to drive said first clutch member, means for automatically disconnecting said first clutch member from the shaft after the clutch member has been driven a predetermined distance, a second clutch member, means controlled by the first clutch member, to cause the second clutch member to be driven by the shaft, a carriage, means for laterally shifting and line spacing the carriage driven by said second clutch member, and means controlled by the carriage as it is shifted to a predetermined position for causing the first clutch member to be driven a further predetermined distance by said shaft.

8. In an electric typewriter, a power drive shaft, a cam freely mounted on the shaft, a carriage return key lever, mechanism operated by the key lever upon depression thereof for locking the cam to the drive shaft during a predetermined increment of rotation of the shaft whereby to cause the cam to experience a predetermined increment of rotation, a clutch adapted to be driven from said shaft, means operated by the cam upon said increment of rotation for causing the clutch to be driven by said shaft, a carriage, a platen carried by the carriage, and a lever carried by the carriage and controlled by

by the clutch to line-space the platen and return the carriage.

- 5 9. In an electric typewriter, a power drive shaft, a cam freely mounted on the shaft, a carriage return key lever, mechanism operated by the key lever upon depression thereof for locking the cam to the drive shaft during a predetermined increment of rotation of the shaft whereby to cause the cam to experience a pre-
- 10 determined increment of rotation, a clutch adapted to be driven from said shaft, means operated by the cam upon said increment of rotation for causing the clutch to be driven by said shaft, a carriage, a platen carried by the carriage, and a
- 15 lever carried by the carriage and controlled by the clutch to line-space the platen and return the carriage, and means for returning the parts to initial position after the platen has been line-spaced and the carriage returned.
- 20 10. In an electric typewriter, a power drive shaft, a cam freely mounted on the shaft, a carriage return key lever, mechanism operated by the key lever upon depression thereof for locking the cam to the drive shaft during a pre-
- 25 determined partial increment of rotation of the shaft, whereby to cause the cam to experience a predetermined partial increment of rotation, a clutch adapted to be driven from said shaft, means operated by the cam upon said partial

increment of rotation for causing the clutch to be driven by said shaft, a carriage, a platen carried by the carriage, and a lever carried by the carriage and controlled by the clutch to line-space the platen and return the carriage, and means for completing the rotation of the cam and for returning the parts to initial position after the platen has been line-spaced and the carriage returned.

11. In an electric typewriter, a power drive 10 shaft, a cam freely mounted on the shaft, a carriage return key lever, mechanism operated by the key lever upon depression thereof for locking the cam to the drive shaft during a predetermined increment of rotation of the shaft, 15 whereby to cause the cam to experience a predetermined increment of rotation, a clutch having a friction plate fixed to said shaft and a cooperating friction plate loosely mounted on said shaft, means for engaging said friction plates, 20 means operated by the cam upon said increment of rotation for causing the operation of said engaging means, a carriage, a platen carried by the carriage, and a lever carried by the carriage and controlled by the clutch upon operation of the 25 engaging means to line-space the platen and return the carriage.

JAMES F. KOCA.