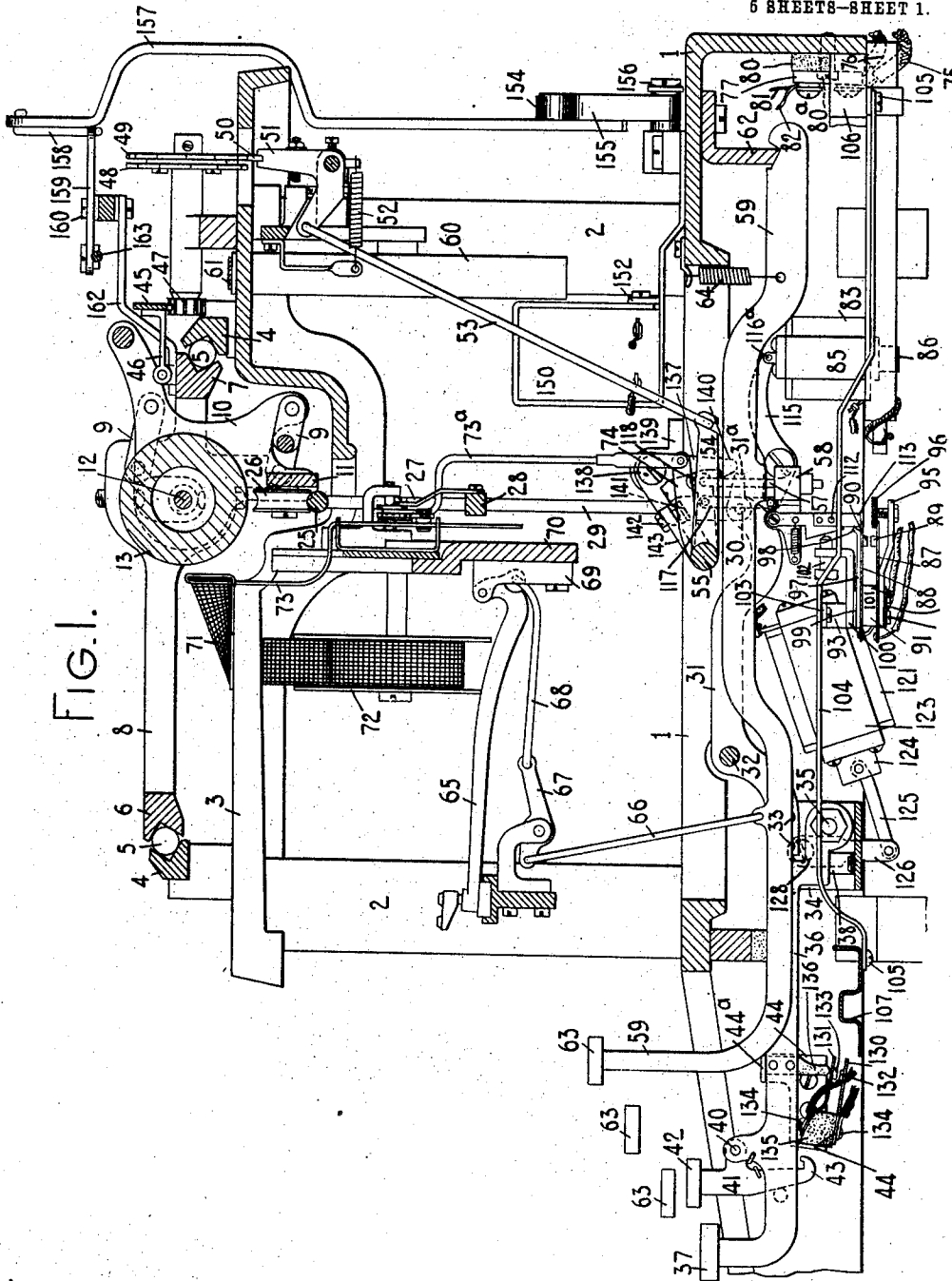


1,025,943.

Patented May 7, 1912.

5 SHEETS-SHEET 1.



WITNESSES:

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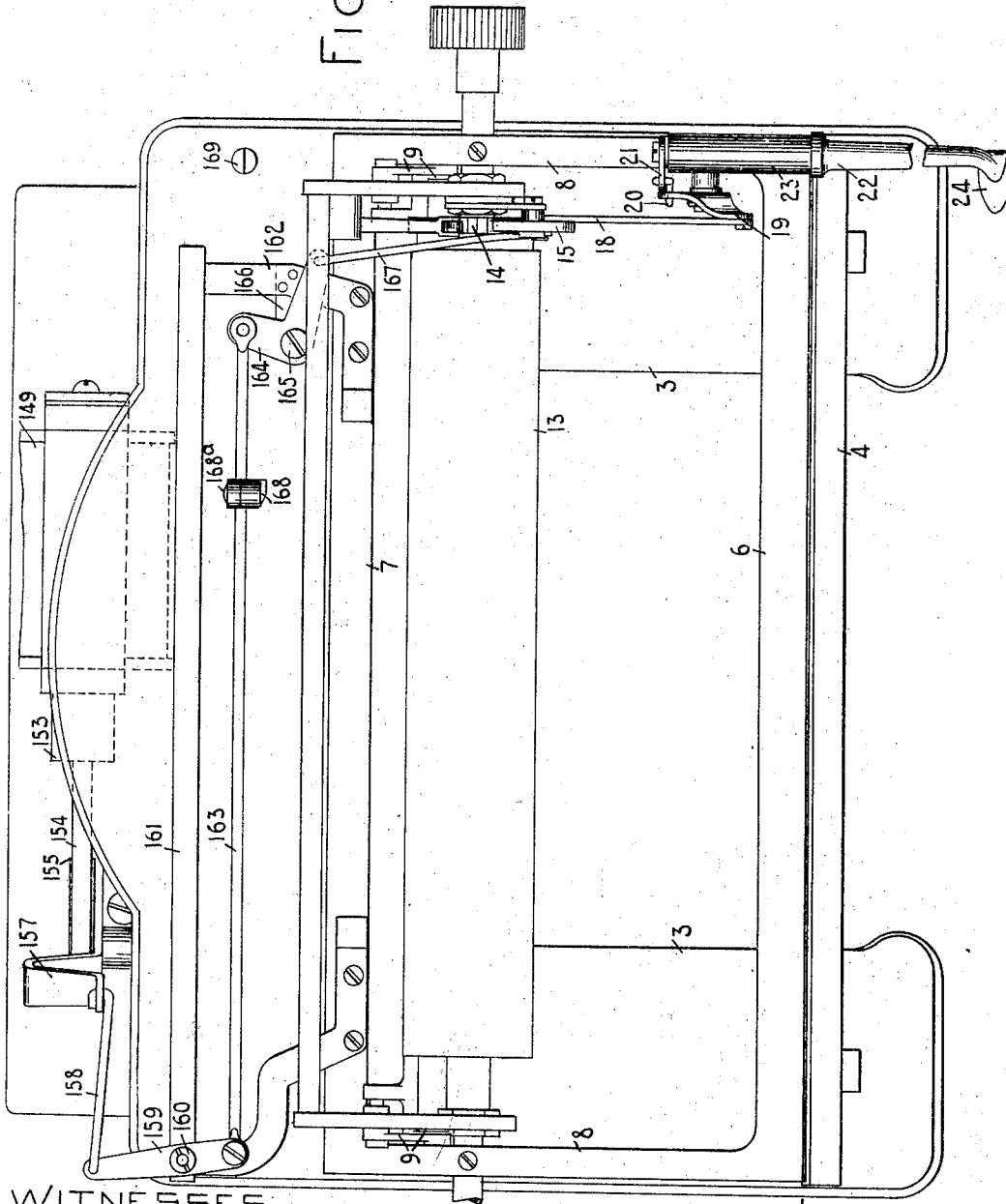
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1,025,943.

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5 SHEETS—SHEET 2.

FIG. 2.



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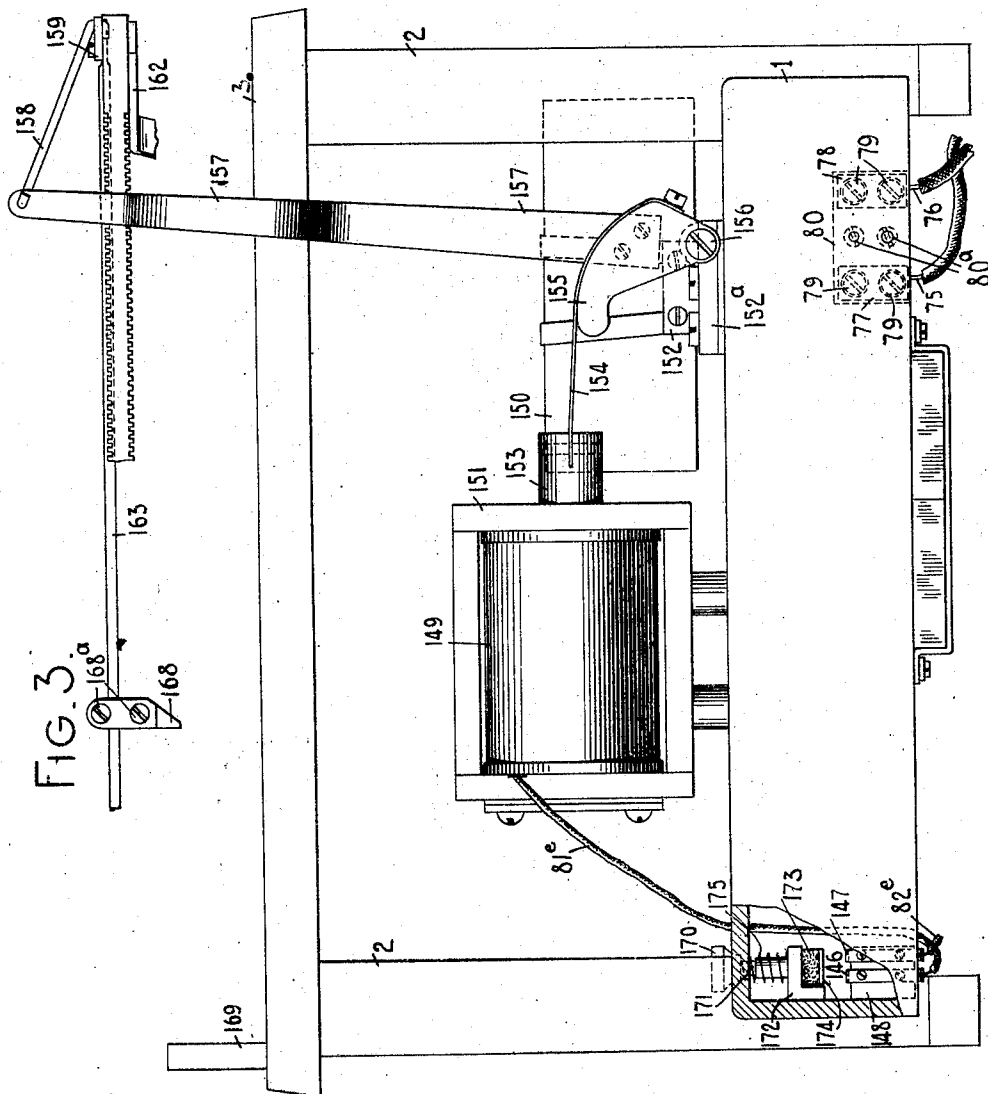
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B. A. BROOKS.
TYPE WRITING MACHINE.
APPLICATION FILED AUG. 22, 1911.

Patented May 7, 1912.
5 SHEETS—SHEET 3.

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TYPE WRITING MACHINE.
APPLICATION FILED AUG. 22, 1911.

1,025,943.

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5 SHEETS—SHEET 4.

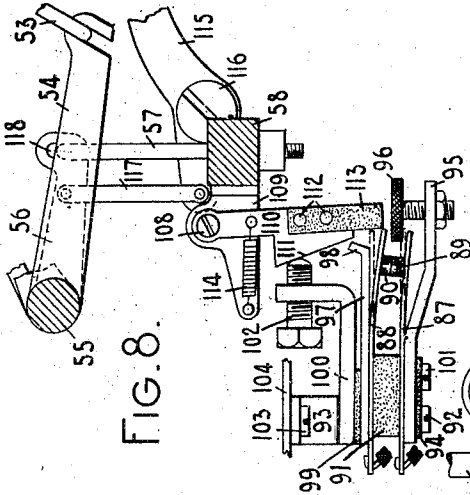


FIG. 8.

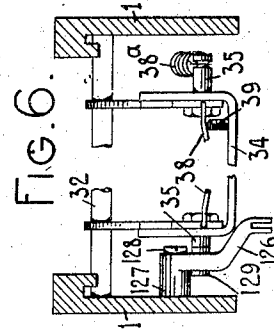


FIG. 6.

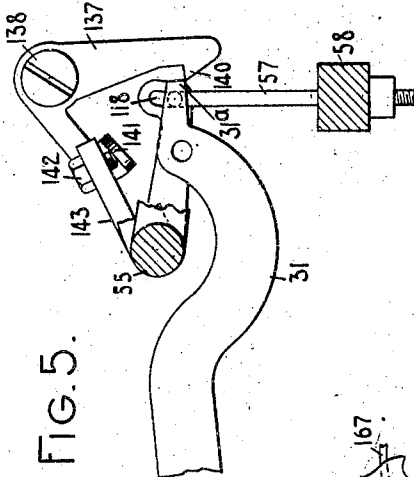


FIG. 5.

FIG. 4.

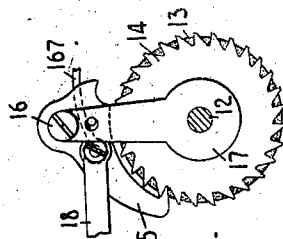
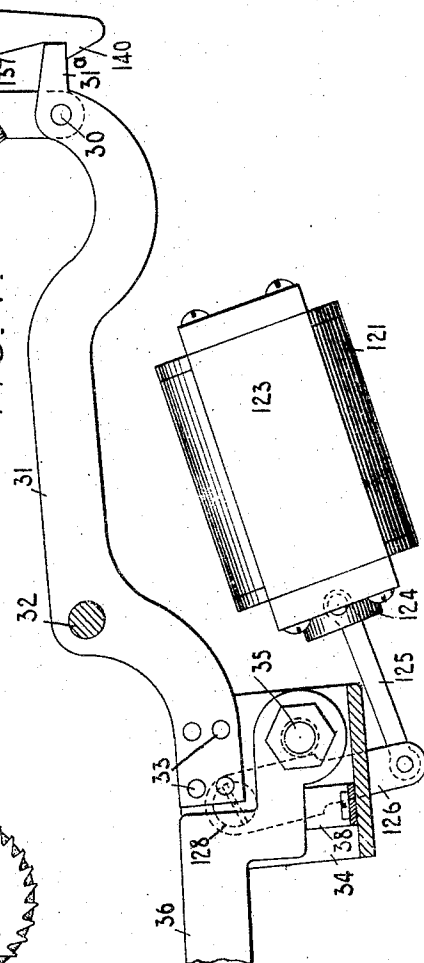


FIG. 7.



WITNESSES.

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TYPE WRITING MACHINE.
APPLICATION FILED AUG. 22, 1911.

Patented May 7, 1912.
6 SHEETS—SHEET 5.

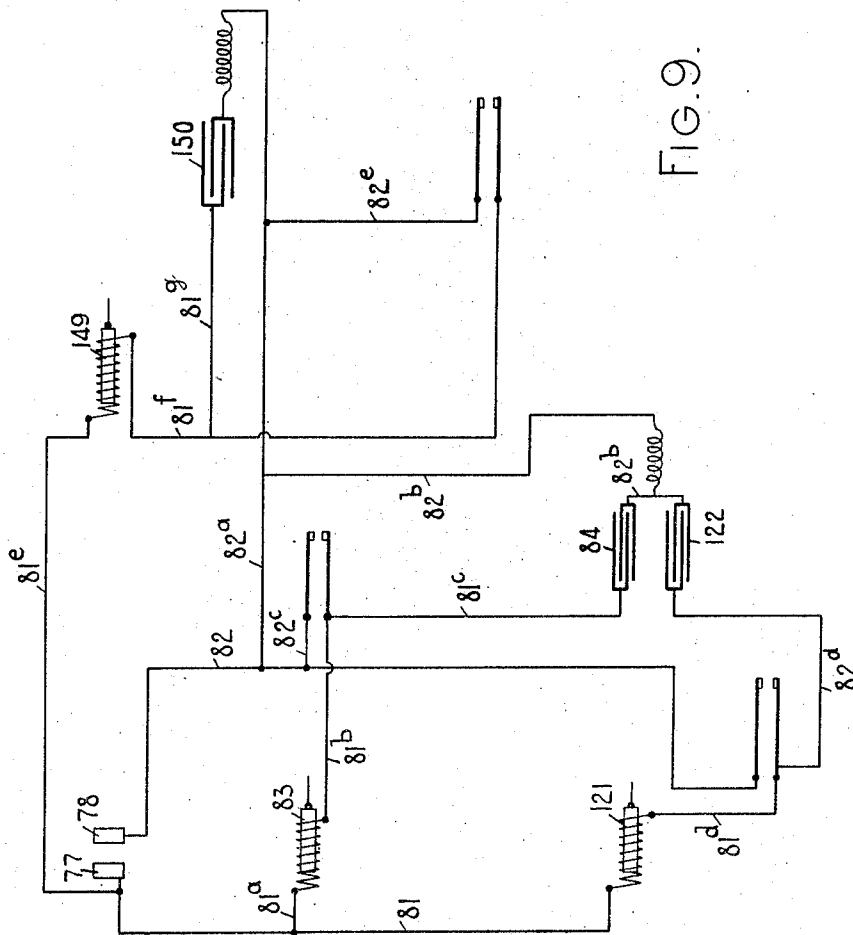


FIG. 9.

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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

1,025,943.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed August 22, 1911. Serial No. 645,350.

To all whom it may concern:

Be it known that I, BYRON A. BROOKS, citizen of the United States, and resident of the borough of Brooklyn, city of New York, 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.

10 My invention relates especially to electrically operated typewriters and has for its object to reduce the labor of operating the machine by applying electric power to operate the escapement, the case shifting mechanism and the carriage return and line spacing mechanisms.

To the above and other ends my invention consists in the features of construction, combinations of devices and arrangements of parts hereinafter described and particularly pointed out in the claims.

As I estimate it, the power required for operating the printing key levers is about equally divided between the key lever restoring spring and the associate type bar on the one hand and the escapement and its spring on the other; and accordingly by actuating the escapement electrically the labor of operating the printing keys is reduced about one-half. At the same time, the escapement operates more quickly and being released automatically at the end of a key stroke, the effect of the escapement spring is obtained to restore the printing key, this action being the same whether the key is operated slowly or quickly or even if it be held down. Further, the weight of the carriage does not materially affect the speed of operation. The main spring and the escapement spring can be put under any desired tension for quickening the operation without retarding the key lever. In order to accomplish this result the universal bar is constructed to have a slight degree of lost motion so that it may be moved independently and the power necessary to be applied by the operator to the escapement devices proper in order to actuate them is practically negligible.

50 In carrying out my invention a device which I call a "tripper" is connected to a key controlled universal bar to effect a contact to close the electric circuit through a

solenoid, the solenoid being thereby energized and operating the rock shaft which supports the universal bar of the Remington No. 10 typewriting machine, to which my invention is shown as applied. When the tripper has closed the circuit by bringing the contact points together and the movement of the universal bar is continued it automatically trips off and breaks the circuit, thus bringing the escapement restoring spring into action. The tripping is effected directly by the key lever acting on the universal bar and the restoring spring does not affect the key lever until the type bar has nearly reached the platen, when said spring comes into action. I regard the provision of a tripping device to close the electric circuit as essential, since otherwise the circuit would remain closed as long as the key was held down and when the key was released there would be a tendency for the circuit to close again, causing repeated spacing movements of the carriage.

In connection with the platen shifting mechanism, I provide a solenoid which is energized immediately the depression on the shift key is begun, the core of the solenoid acting to shift the platen. This will remain in its shifted position after the key has been released until a character is printed by operating one of the printing keys, when the shifting mechanism will be automatically released. To effect this result a hook is provided which coöperates on the shift mechanism to hold the platen in its shifted position until said printing key is operated, whereupon the hook is automatically released, the release being effected by the operation of the aforesaid rock shaft. The construction is such that no matter how quickly or lightly the shift key is depressed the platen or shiftable element is brought into position to print a capital letter and instantly locked, no additional manual force being required to depress the shift key beyond the initial, slight depression thereof. A tripper like that employed for the escapement mechanism may also be employed with the shifting mechanism to prevent a faulty operation of the shift mechanism by the maintenance of the shift key in depressed position during the printing of more than one character. A solenoidal magnet is also

employed to return the carriage rightward to begin new lines of writing and concurrently to rotate the platen for line spacing. In this connection a key in the keyboard is provided to operate the solenoid, said key, when depressed, closing the circuit and energizing the solenoid which has its armature connected to a cam surface or fusee; the latter in turn being connected to the carriage through a train of devices comprising two levers and a link; the second lever being in turn connected to the regular line spacing pawl. The construction is such that when the carriage returning key is operated the power of the magnet is applied directly to the second lever which tends, through its connections, to turn or rotate the platen; but preferably the power is not sufficient to accomplish this result and accordingly the carriage will be returned to the right before the platen is rotated. To limit the returning movement an adjustable stop is introduced in the train of connections between the second lever and the line spacing pawl, said stop co-acting with a fixed abutment on the frame of the machine. The momentum due to this co-action will effect the rotation of the platen, the shock due to said co-action being absorbed in rotating the platen. The adjustable stop is set to correspond with the regular adjustable margin stop and so that it will contact with the fixed abutment about two spaces before the carriage is at the end of its movement, thus insuring rotation of the platen before the end of the movement.

My invention will be more particularly described in connection with the accompanying drawings, wherein—

Figure 1 is a vertical, front to rear central sectional view of so much of a No. 10 Remington typewriting machine as is necessary to illustrate my invention. Fig. 2 is a fragmentary top plan view of the machine, parts being omitted. Fig. 3 is a fragmentary, rear elevation of the machine, parts being omitted and parts broken away. Fig. 4 is a fragmentary, side elevation partly in section showing portions of the platen shifting and locking mechanism in the operated position. Fig. 5 is a view corresponding to Fig. 4 but omitting some of the parts shown in the latter figure and showing the locking devices as they are in the course of the unlocking operation. Fig. 6 is a front elevation partly in section of portions of the platen shifting mechanism. Fig. 7 is a fragmentary side elevation partly in section showing portions of the line spacing mechanism. Fig. 8 is a side elevation partly in section showing portions of the electrical devices connected with the escapement mechanism. Fig. 9 is a diagram of the electrical connections.

Referring especially to Figs. 1 to 3 of the drawings, the main frame of the machine is shown as comprising a base 1, corner posts 2 and a top plate 3. Track-ways 4 fixed above the top plate coöperate through anti-friction balls 5 with the front bar 6 and rear bar 7 of a rectangular truck which further comprises end bars 8. Links 9 connect to the truck a shiftable platen frame comprising end bars 10 and a cross bar 11. Journaled in the end bars 10 is an axle 12 supporting a rotary platen 13. Operatively connected with the right-hand end of the platen is a line spacing ratchet wheel 14 (Figs. 2 and 7) with which is associated a line spacing pawl 15, said pawl being pivotally supported at 16 on an arm 17 bearing on the axle 12. The ordinary line spacing devices further comprise a link 18 connecting the pawl 15 with a bell crank lever 19, said lever being connected by a link 20 with a crank arm 21 fast on a rock shaft 22 which is journaled in a bearing 23 on the right-hand end bar 8 and is provided with a handle or finger piece 24 which may be operated to engage the pawl 15 to line space the platen and also to restore from left to right the platen and platen carriage comprising the truck and the platen frame. The platen frame is shiftable on the truck to change case through devices comprising a shift rod or track 25 (Fig. 1) on which bears a wheel or roller 26 journaled on the cross bar 11. The rod 25 is comprised in a shiftable frame which further includes uprights 27 and a connecting cross bar 28 from the ends of which depend arms 29 each of which is pivotally connected at 30 with the rear arm of a lever 31. The levers 31, as best shown in Fig. 6, are secured to a rock shaft 32 near its ends, said rock shaft taking bearings in the sides of the base 1. The arms of the levers 31, forward of the rock shaft 32, have riveted to them at 33 a U-shaped plate 34, the plate 34 and the arms 31 constituting in effect a single member. Pivoted on screw studs 35 to each side of the member 34 are forwardly extending levers 36 each terminating in a shift key 37. A leaf spring 38 is screwed at its middle to the bottom of the member 34, the ends of said spring curving upward and underlying the levers 36. A screw 39 coöperates with the right-hand end of the spring 38 to stiffen the same; but the usual corresponding screw at the left is dispensed with. A restoring spring 38^a is connected to the member 34 (Fig. 6). The construction is such that the shift keys 37 are yieldingly connected with the platen shifting frame. Pivoted at 40 to the left-hand lever 36 is an upright spring-pressed lever 41 provided with a finger piece 42 and terminating at its lower end in a hook 43 which is adapted

to cooperate with a fixed abutment or bracket 44 to lock the shift frame in operative position so as to maintain the platen in upper case position. When one of the keys 5 37 is depressed it operates to turn the rock shaft 32 and raise the platen shifting frame which operates to move upward the platen frame 10, 11 and platen, this shifting movement of the platen and platen frame not 10 affecting the truck 6, 7, 8.

The letter spacing movements of the platen and the platen carriage are controlled by devices comprising a feed rack 45 secured to arms 46 pivoted on the truck bar 7. Said rack 15 45 is normally maintained in spring-pressed relationship with a feed pinion 47 which is operatively connected with toothed escapement wheels 48 and 49. Cooperative with said escapement wheels is a feed dog 50 20 mounted at the top of a dog rocker 51 pivoted on the machine frame and provided with a restoring spring 52. The dog rocker is connected by a link 53 with an arm 54 fixed to and projecting rearward from an 25 escapement rock shaft 55 which extends across the machine above the key levers and is journaled in the sides of the base. Projecting rearward from the rock shaft 55 near its ends are crank arms 56 from which 30 depend arms 57 supporting a universal bar 58, said universal bar underlying a set of printing key levers 59 and being operative thereby to cause the feed dog 50 to cooperate with the escapement wheels 48 and 49 to 35 permit leftward letter space movements of the carriage to take place under the pull of a main spring which is contained in a spring drum 60 connected with the carriage truck by a band or strap 61.

40 The key levers 59 are fulcrumed on a fulcrum bar 62 and are each provided with a finger key 63 and a restoring spring 64. Each key lever is connected with an associate type bar 65 by a train of devices comprising a link 66, a sub-lever 67 and a second link 68. The type bars are pivotally 45 supported on hangers 69 circularly arranged and secured to a stationary support 70.

The type bars are adapted to cooperate 50 with the front face of the platen through a ribbon 71 mounted on spools 72 which are adapted to be rotated in the usual or any other suitable manner so as to feed the ribbon lengthwise. The vibratory movements 55 of the ribbon are controlled by a vibrator 73 through which the ribbon is threaded, said vibrator being connected by the usual or other suitable devices including a link 73^a with an arm 74 fixed to and projecting rearward from the rock shaft 55. The parts 60 thus far described are or may be of the usual character found in the No. 10 Remington machine.

The machine is connected with a source

of electrical power such as an electric light 65 socket by wires 75 and 76 which run respectively to metal contacts 77 and 78 which are secured by screws 79 to a plate 80 of fiber or the like (Figs. 1 and 3). The plate 80 on which the contacts are mounted is secured 70 to the rear of the base 1 by screws 80^a, and insulates the contacts 77 and 78 from the machine frame. As will be understood from Figs. 1, 3 and 8, separate magnets and associate condensers are provided for the 75 escapement, the platen shift and the carriage return mechanism respectively and the machine is so wired as to enable the current from the contacts 77 and 78 to energize one solenoid without affecting the others. The 80 circuit is normally open, sets of spring contact devices being provided, one set for each solenoid, the contacts of each set being normally separated but being adapted to be brought into contact to effect the action of 85 the mechanisms with which they are associated, *i. e.*, the escapement, the platen shift and the carriage return. It will further be understood that the solenoidal magnets, condensers and contact devices are or may be of 90 any known construction which is adapted to the purposes of my present invention and since these electrical devices in themselves are not of my invention it is not considered necessary to describe them with any great 95 particularity.

Circuit wires numbered 81 and 82 (Figs. 1 and 9) run respectively from the main contacts 77 and 78 and are connected 100 through wire 81^a with the solenoid 83, and with the condenser 84 through wires 82^a and 82^b, said solenoid and condenser being the ones associated with the escapement mechanism. The solenoid 83 is vertically disposed and mounted in a rectangular bracket 85 105 which is suitably secured to the left-hand side of the base 1 near its rear, and associated with said solenoid is an armature 86 which in normal inoperative position is dropped down out of the magnet field. 110 Wires 81^b and 82^c lead from the solenoid 83 and from the wire 82 to spring arms 87 and 88 which are provided with normally separated contacts proper 89 and 90, the circuit through the condenser 84 being completed 115 by the wire 81^c. The contact devices comprising respectively the arm 87 and contact 89 and the arm 88 and contact 90 are separated by an insulating plate 91 and are secured by a screw 92 to the cross arm 93 of 120 a supporting bracket, said screw also serving to secure various other devices to said bracket as clearly appears in Figs. 1 and 8. Beginning at the bottom the screw 92 passes upward through an insulating plate 94, then 125 through a stop arm 95 which carries an adjustable headed stop 96, then through the lower contact arm 87 and the insulating

plate 91, the upper contact arm 88 and through a stop arm 97 for the upper contact, said stop arm terminating in an upturned end 98. Next the screw 92 passes through a narrow insulating plate 99 and then through an angular support-member 100 into the cross bar 93. An additional screw 101 may be employed to assist in clamping the various layers. The member 100 supports an adjustable abutment 102. The cross arm 93 is secured at its ends by screws 103 to parallel arms 104 which extend fore and aft of the machine and are secured at their ends by screws 105 to fixed members 106 and 107 which are comprised in the regular tabulating mechanism of the machine. The parallel arms 104 and the cross bar 93 constitute an H-shaped bracket which supports the contact devices and their associate contact devices heretofore described at about the middle of the under side of the machine slightly forward of the universal bar 58.

The contact devices 87, 89, 88 and 90 are controlled by a tripping device or tripper which, as shown in Figs. 1 and 8, is pivoted at 108 to an angular bracket 109 secured at the front of the universal bar 58. The tripper comprises a loosely pivoted depending arm 110 which is provided at its forward side with an inclined or cam edge 111 co-operative with the abutment 102. Riveted at 112 to the arm 110 is a finger 113 of fiber or other insulating material, said finger extending downward below the arm 110 and normally being contiguous to the rear end of the contact arm 89 which projects beyond the upturned end or stop 98. The forward edge portion of the finger 113 is normally maintained in contact with the stop 98 by a coiled spring 114 one end of which is secured to the arm 110 and the other end to the bracket 109. The spring 114 and stop 98 cooperate to retain the tripper in normal position as will be seen from Fig. 1.

As heretofore stated the rocker bar is adapted to be moved electrically after the initial movement of the universal bar is received from the hand of the operator acting through a printing key lever to close the circuit. Accordingly the rocker bar is connected with the armature 86 through devices which comprise a lever 115, said lever having a fixed pivot 116 at the left-hand side of the base. The rear arm of the lever 115 is pivotally connected at 116^a to the upper end of the armature 86. The forward arm of the lever 115 is connected by an upright link 117 with the left-hand crank arm 56 forward of the arm 57. In order to afford lost motion between the crank arms 56 and the arms 57 the rear ends of the arms 56 are formed with slots 118 with the lower ends of which the hooked ends of the arms 57 normally engage, said

slots replacing the ordinary round holes and closed connections heretofore provided in the machine. It will be understood that the solenoid and connections to the escapement mechanism described above as at the left-hand side of the machine may be duplicated if desired at the right-hand side, or placed in any other suitable position. Suppose that one of the printing keys be operated. As soon as the actuated key lever 59 contacts with the top of the universal bar 58, downward movement of the universal bar will begin and corresponding movement of the tripper 110, 113 will take place. A very slight extent of downward movement of the latter will cause the finger 113 to depress the flexible arm 88 and bring the contact 90 into engagement with the contact 89, thus closing the electric circuit and energizing the solenoid 83 which will pull the armature 86 upward. The upward movement of the armature actuates the lever 115, causing the forward arm of the lever to pull down on the link 117, the link acting through the left-hand crank arm 56 to rock the shaft 55. By reason of the lost motion at the slots 118, the rock shaft 55 may move ahead of the universal bar, and through the crank arm 54 and link 53 may operate the dog rocker 51, causing the dog 50 to disengage from the escapement wheel 49 and engage with the escapement wheel 48. The abutment 102 is so adjusted that it will act against the cam edge 111 to force the tripper rearward about the pivotal center 108 so as to cause the finger 113 to slide off the arm 88, releasing the latter and permitting it through its inherent springiness to swing backward to normal position against the stop arm 97, and also permitting the arm 87 to swing back against the under side of the headed stop 96. As soon as the arm 88 is released, the contacts 89 and 90 will separate, thus breaking the circuit and deenergizing the magnet whereupon the armature 86 will drop out of the solenoid and the connected parts will return to normal position. It will be observed that the construction is such that except for very slight initial movement communicated to the universal bar by the operator's finger, the movement downward of the universal bar and the movements of the escapement devices controlled thereby are electrically actuated while the return movement of these parts is accomplished by gravity and the restoring spring 52. The finger of the operator is thus relieved of a considerable portion of the work and the touch is correspondingly lightened. In other words, instead of having to actuate the type bar mechanism and the escapement devices as heretofore, the operator is practically relieved of the work of operating the escapement, leaving him only the type

bar mechanism, including the actuated key lever and the connected type bar to operate, while receiving the aid of the escapement spring to return the type bar to normal position.

As heretofore stated, I also provide for shifting the platen electrically. The solenoid and associate condenser provided for this purpose are respectively numbered 121 and 122. The solenoid 121 is horizontally disposed having a slight upward and rearward inclination as shown in Figs. 1 and 4 and is supported on a rectangular bracket 123 which is secured at the left-hand side of the base 1. The armature 124 of the solenoid 121 normally stands forward and downward out of the magnetic field (Fig. 1) and is connected by a link 125 with the lower end of a pendent arm or lever 126. As seen in Fig. 6 the lever 126 is off-set leftward and at its upper end is provided with a hub 127 which receives a fulcrum screw 128 supported in the left-hand side of the base 1. The lever 126 is adapted to co-operate at its rear side below its fulcrum with a roller 129 mounted on the left-hand stud 35 which projects laterally outward beyond its support. The construction is such that when the solenoid 121 is energized the armature 124 is drawn in as shown in Fig. 4, operating to pull the lever 126 against the roller 129 and thereby swinging the frame 31, 34 on the rock shaft 32, shifting the platen. In order to make and break the circuit through the solenoid 121, contact devices are provided comprising flexible arms 130 and 131 on which are respectively mounted contacts proper 132 and 133.

As shown in Fig. 1 the contact devices are secured by screws 134 to the upper and lower sides of a support 135 of fiber or other insulating material, said support being mounted on the bracket 44. The contacts proper 132 and 133 are normally separated as shown in Fig. 1, and as shown in Fig. 9 wires 81^a and 82^a are adapted to complete the circuits through the associate solenoid and condenser. A finger 136 of fiber or the like is secured to the left-hand lever 36 and extends downward therefrom, its lower end or tip being contiguous to the upper flexible contact arm 131 so that when a slight initial depression is given the left-hand shift key 37 the finger 136 will press down the arm 131 and bring the contact 133 into engagement with the contact 132, closing the circuit and energizing the solenoid 121 which will act as heretofore described to draw in the armature 124 and operate the platen shifting frame to elevate the platen to upper case position. It will be understood that when the left-hand shift key is depressed initially the left-hand lever 36 will swing downward on its pivotal axis 35 without affecting the member 34, owing to

the fact that the usual screw 39 is dispensed with at the left, resulting in a consequent yielding of the spring 38 to permit of the independent movement of the lever 36. This independent movement of the lever is sufficient to bring the contacts 132 and 133 into engagement and close the circuit. As a result substantially the entire platen shifting movement is electrically actuated. After the slight initial depression the operator may release the lever 36 which returns to normal position against a stop lip 44^a on the bracket 44 under the impulse of the spring 38. This return movement of the lever will break the circuit and deenergize the solenoid 121. Mechanical locking devices are provided to lock the platen automatically in upper case position after it has been shifted as described, said locking devices coöperating with a nose or projection 31^a integral with the left-hand lever 31 and extending rearward therefrom back of the pivotal point 30. The locking devices comprise a bell crank lever 137 which is pivotally supported at 138 on a bracket 139 fixed to the upper edge of the left-hand side of the base 1, and may be retained in normal position by a spring (not shown). One arm of the bell crank 137 hangs downward normally inside the base 1 and somewhat to the right of the left-hand side thereof, this depending arm terminating in a hook 140 which is adapted to coöperate with the under side of the nose 31^a. The other arm of the bell crank 137 inclines forward and downward and terminates in an angularly disposed lip 141 which is adapted to coöperate with an adjustable screw 142 supported on a crank arm 143 fixed to the rock shaft 55 near its left-hand end and inclining upward and rearward therefrom. The normal position of the locking devices is shown in Fig. 1 from which it will be observed that the nose 31^a is normally below the hook 140 while the screw 142 is slightly above the lip 141. When the platen is shifted upward as heretofore described, the nose 31^a will swing upward around the pivotal axis 32, acting against the under inclined edge of the hook 140, camming the bell crank slightly rearward until the nose swings past the hook; whereupon the hook will drop in under the nose as shown in Fig. 4, thus serving to lock the nose and connected parts, including the platen, in upper case position. The locking devices may be duplicated at the right.

After the platen has been shifted and locked as described the operation of one of the character keys to print a capital will act automatically to unlock the locking devices 140 and 31^a, permitting the platen shifting devices and the platen to move back to normal position. This result is obtained by the action of the screw or adjustable device 130

142 attached to the rock shaft 55 against the lip 141. When a character key is operated the escapement devices will be actuated as heretofore described and the shaft 55 rocked, thus swinging the crank arm 143 rearward, causing the screw 142 to contact with the lip 141 to actuate the bell crank 137, swinging the hooked arm thereof rearward and causing the hook to disengage from the nose 31^a as shown in Fig. 5, thus unlocking the connected parts. By this means the operation of a key mechanically restores the platen to normal position independent of the shift key.

15 The electrical circuit operating to return the carriage and rotate the platen comprises wires 81^a and 81^b and 82^a which connect the wires leading from the main contacts 77 and 78 to the supplemental contacts 146 and 147 (Figs. 3 and 9). The latter are right angled having horizontally disposed portions and are mounted on a support 148 of fiber or other insulating material secured to the right-hand side of the base near the front thereof. The circuit aforesaid includes a horizontally disposed solenoid 149 and a condenser 150, the circuit through the condenser being completed by the wire 81^b. The solenoid is mounted on a bracket 151 secured to the upper rear side of the base, and the condenser on a bracket 152 similarly secured. Cooperating with the solenoid 149 is an armature 153 which, as appears from Fig. 3, is connected by a flexible band or strap 154 with a cam member or fusee 155 pivotally supported at 156 on a bracket 152^a. Fixedly connected with the fusee is the lower end of a lever 157 which is thus in effect also pivoted at 156 and extends upward at the rear of the machine having a bend to clear the top plate, as shown in Fig. 1 and terminating some distance above the same. The upper end of the lever 157 is connected by a link 158 with the rear arm of a horizontally disposed lever 159 pivoted at 160 to the left-hand end of the usual column stop bar 161, said bar being mounted on angular brackets 162 secured to the truck bar 7 (Figs. 1, 2 and 3). The forward arm of the lever 159 is connected to the left end of a link 163 that extends horizontally lengthwise of the platen and behind the same, the right-hand end of said link being pivoted to the rearwardly extending arm of a bell crank 164. The bell crank is fulcrumed at 165 to an arm 166 riveted to the right-hand bracket 162 and the forward arm of said bell crank is connected by a link 167 to the pawl member 15. Adjustably secured to the link 163 is a downwardly extending stop 168 which is adapted to cooperate with a fixed abutment or upstanding stop 169 on the top plate 3. The stop 168 is adjusted to correspond with the adjustable margin stop (not shown) at the front of the machine and in

such relationship with the fixed stop 169 that said stop 168 will contact therewith some two spaces prior to the engagement of the regular margin stops to arrest the carriage in its final position at the right of the machine to begin a new line. To render the stop 168 adjustable it is split as shown in Fig. 2 to embrace the rod or link 163 and the split portions are clamped together by screws 168^a, the friction serving to retain the stop in adjusted position. To close the circuit and energize the solenoid 149 at will, a key 170 (Fig. 3) is provided, said key being secured at the top of a stem 171 which bears in a sleeve on a bracket 172 secured to the right-hand side of the base 1. Below the bracket the stem 171 carries a head 173 of fiber or other insulating material and secured to the lower face of the head is a contact plate 174 which overlies the horizontal portions of the contacts 146 and 147 but is normally maintained separated therefrom by a coiled spring 175 confined between the key button 170 and the bracket 172 and surrounding the sleeve thereof. The spring mounted carriage return key 170 is located at the right-hand side of the regular keyboard where it may be conveniently actuated.

Supposing the parts to be in the positions shown in Figs. 2 and 3 and that it be desired to return the carriage toward the right, the operator presses the key 170, overcoming the spring 175 and causing the contact 174 to engage with the top, horizontal portions of the contacts 146 and 147, thus closing the circuit and energizing the solenoid 149. When the solenoid is energized it will draw inward or toward the right the armature 153, and the movement of the armature will be transmitted through the band 154 and fusee 155 to the lever 157 and thence through the link 158 to the lever 159. The friction in the train of line spacing devices opposes a greater resistance to the pull of the link 158 than does the bodily rightward movement of the carriage, and as a result the lever 159 will not turn on its fulcrum to pull the link 163 leftward but will instead be maintained in its normal position on its fulcrum, operating in effect as a member fixed on the carriage and transmitting the pull of the link 158 to the carriage which will consequently be moved bodily toward the right until arrested by the margin stops. Two spaces before this arrest takes place the contact 168 will engage with the fixed contact 169 resulting in a leftward longitudinal movement of the link 163, turning the bell crank 164 and causing the link 167 to operate the line spacing pawl 15 to turn or rotate the platen a line space distance, the momentum with which the contact 168 strikes the fixed contact 169 overcoming the friction of the train of line spacing devices.

This line spacing operation brought about by the co-action of the devices 168 and 169 also serves in effect to cushion the carriage so that it will be arrested without undue jar and shock. On releasing the key 170 the circuit will be broken and the solenoid 149 deenergized, so that thereafter during letter space leftward movements of the carriage the lever 157 will, under the pull of the link 158, swing leftward on its fulcrum, drawing out the armature 153 leftward from the solenoid.

By my present invention I accomplish practically all that can be obtained by the application of extraneous power, electrical or otherwise, to a typewriter, since the printing keys must be operated in any case and must have substantially the same kind of action as operators have been accustomed to heretofore.

By employing my invention the action of the keys is made light and easy, practically no more power being required than to operate the type bar alone while the character of operation is not substantially altered. Furthermore, the operator being relieved of the labor of shifting the platen and returning the carriage, by the employment of auxiliary power, the result will be that the speed and ease of operation of the machine is increased to a maximum.

It will be observed that by my present invention I provide escapement devices in combination with a universal bar and lost motion connections between said universal bar and certain of said escapement devices, in the present instance the feed dog 50 and the dog rocker on which the same is mounted; that in the present instance the lost motion connections are mechanical connections between the universal bar and a member or rock shaft, the rock shaft being provided with slotted crank arms which are engaged by arms that support the universal bar, the slots in the crank arms affording the lost motion connection between the member or rock shaft and the universal bar; that connected with the universal bar is a source of power, in the present instance an electro or solenoidal magnet; that the member or rock shaft is operative or movable by a set of connections to the universal bar and also by a second set of connections which connect to the source of power or electromagnetic devices; that said member or rock shaft is initially movable by the first set of connections from the universal bar, and is thereafter movable by the second set of connections independently of the first set of connections; that the universal bar is operated by key levers; that the key levers in the present instance are connected to type bars; that the universal bar operates a device which energizes an electro-magnet; that in the present instance said device is pivot-

ally supported on the universal bar; that said device is operative to close the contacts of an electric circuit containing the electro-magnet, thereby energizing the magnet; that the device aforesaid is tripped to release the contacts and open the circuit; that the means for tripping the device comprises a fixed abutment which coöperates with the device to produce a camming action thereon; that the member or rock shaft aforesaid is first movable manually through the universal bar; that thereafter in the course of operation the rock shaft is movable electrically, and near the end of this electrical movement the rock shaft picks up the universal bar in-turn and moves it so as to cause the tripper to break the circuit and deenergize the electro-magnet; that instead of obtaining independent movement of the universal bar by a lost motion connection with the rock shaft, the universal bar may be entirely disconnected from the rock shaft; and that in fact a separate independent universal bar may be employed to close the electric circuit.

Further it will be noted that by my present invention a platen and a set of type bars are provided, these elements being relatively shiftable to change case and being combined with electrical devices for effecting such relative shift; that mechanical devices are provided for locking the shifted element after it has been shifted; that the locking devices operate automatically; that means are provided for unlocking the lock; that the unlocking means is also automatic; that in the present instance the unlocking means or means for freeing the shifted element from the lock is operative from the printing keys, the first printing key actuated after the shift effecting automatically the unlocking of the shifted element; that a manually operative shift key is provided in combination with a circuit containing an electro-magnet and provided with contact devices, said contact devices being normally separated and being controllable from said shift key; that the devices for effecting the relative shift between the type bar and platen elements comprise a lever; that a lock coöperates with said lever after it is shifted; that the lock operates independently of the electrical means which in the present instance are provided for effecting the shift; that the shift lock is unlocked by devices operating independently of the electrical means; that the shift lock operates in the present instance to retain the shifted element in shifted position after the electrical shifting devices have been deenergized; that the shift lock is unlocked in the present instance by printing keys which also perform their unlocking function after the electrical shifting devices have been deenergized. Also it will be seen that by the present invention there are provided in combination

a traveling carriage, an electro-magnet, means for energizing the same, and connections between said carriage and the armature of said magnet; and that a spring motor or spring drum is provided for moving the traveling carriage in one direction and a key controlled electro-magnet is provided for moving the carriage in the opposite direction against the spring motor.

Various changes may be made in my invention without departing from the principles and spirit thereof and parts of the invention may be employed without other parts. For example, although I have illustrated and described a machine which embodied my novel escapement mechanism as well as my novel platen shifting and carriage returning mechanisms, it will be understood that each or any of these several mechanisms may be employed separately and entirely apart from the other novel mechanisms.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of escapement devices, a universal bar, keys for actuating said universal bar, lost motion connections between said universal bar and certain of said escapement devices, actuating devices separate from said keys but operative during the stroke thereof, and connections between said actuating devices and certain of said escapement devices.

2. In a typewriting machine, the combination with escapement devices including a dog rocker, of a universal bar, keys operative on said universal bar, mechanical lost motion connections between said universal bar and said dog rocker, actuating devices separate from said keys but operative during the stroke thereof, and connections between said actuating devices and said dog rocker.

3. In a typewriting machine, the combination of escapement devices, a rock shaft connected to certain of said escapement devices, a universal bar, keys operative on said universal bar, mechanical lost motion connections between said universal bar and said rock shaft, actuating devices separate from said keys but operative during the stroke thereof, and connections between said actuating devices and said rock shaft.

4. In a typewriting machine, the combination of escapement devices, a rock shaft connected to certain of said escapement devices, a universal bar, keys operative on said universal bar, mechanical lost motion connections between said universal bar and said rock shaft, actuating devices separate from said keys, and connections between said actuating devices and said rock shaft.

5. In a typewriting machine, the combination of escapement devices, a rock shaft

connected to certain of said escapement devices, a universal bar, keys operative on said universal bar, mechanical lost motion connections between said universal bar and said rock shaft, actuating devices separate from said keys, and connections between said actuating devices and said rock shaft, said actuating devices being brought into operation by a preliminary actuation of said keys.

6. In a typewriting machine, the combination of escapement devices including a dog rocker, a rock shaft, a crank arm fixed thereon, a link connecting said crank arm with said dog rocker, slotted crank arms fixed to said rock shaft, arms engaging the slots in said slotted crank arms and depending therefrom, a universal bar supported by said depending arms, finger keys operative on said universal bar, actuating devices separate from said finger keys, and connections between said actuating devices and said rock shaft.

7. In a typewriting machine, the combination of a carriage, escapement devices including a dog rocker, a rock shaft, a crank arm fixed thereon, a link connecting said crank arm with said dog rocker, slotted crank arms fixed to said rock shaft, arms engaging the slots in said slotted crank arms and depending therefrom, a set of key levers which said universal bar underlies, printing instrumentalities connected to said key levers, actuating devices separate from said key levers, and connections between said actuating devices and said rock shaft.

8. In a typewriting machine, the combination of escapement devices, a key operated universal bar, lost motion connections between said universal bar and certain of said escapement devices, and an electro-magnet also connected to said escapement devices.

9. In a typewriting machine, the combination of escapement devices, a key controlled universal bar, mechanical connections between said universal bar and certain of said escapement devices, and a source of power connected to said mechanical connections.

10. In a typewriting machine, the combination of escapement devices, a key controlled universal bar, a source of power brought into operation by the action of said universal bar, and connections between said source of power and said escapement devices.

11. In a typewriting machine, the combination of escapement devices, a key controlled universal bar, a source of power brought into operation by the action of said universal bar, connections between said source of power and said escapement devices, and means for disconnecting the said source of power by further operation of said universal bar.

12. In a typewriting machine, the combination of escapement devices, a key controlled universal bar, a member connected to certain of said escapement devices, a set of connections between said member and said universal bar, a source of power, a second set of connections between said source of power and said member, and means for affording movement of said member under the operation of one set of connections independently of said other set.

13. In a typewriting machine, the combination of escapement devices, a key operated universal bar connected to certain of said devices, electro-magnetic devices, and means for energizing said electro-magnetic devices under the actuation of said universal bar and for thereafter operating said escapement devices by said electro-magnetic devices independently of said universal bar.

14. In a typewriting machine, the combination of escapement devices, a key controlled universal bar, a member connected to certain of said escapement devices, a set of connections between said member and said universal bar, a source of power, a second set of connections between said source of power and said member, said member being movable initially by said first set of connections and being thereafter movable independently of said first set of connections by said second set of connections.

15. In a typewriting machine, the combination of escapement devices, a key controlled universal bar, connections including a member between said universal bar and certain of said escapement devices, a source of power connected to said member, and means for thereafter affording movement of said member from said source of power independently of said universal bar.

16. In a typewriting machine, the combination of escapement devices, a rock shaft connected to certain of said escapement devices, slotted crank arms on said rock shaft, arms depending from the slots in said crank arms, a universal bar carried by said arms, printing key levers operative on said universal bar, an electro-magnet connected to said rock shaft, and means including a device operative by said universal bar for energizing said magnet.

17. In a typewriting machine, the combination of escapement devices, a rock shaft connected to certain of said escapement devices, slotted crank arms on said rock shaft, arms depending from the slots in said slotted crank arms, a universal bar carried by said arms, printing key levers operative on said universal bar, a normally open electric circuit containing an electro-magnet connected to said rock shaft, and a device operative by said universal bar for closing said circuit and energizing said magnet.

18. In a typewriting machine, the combination of escapement devices, a key operated

universal bar connected to certain of said escapement devices, a normally open electric circuit containing an electro-magnet connected to certain of said escapement devices, and a device operative by said universal bar for closing said circuit and energizing said magnet.

19. In a typewriting machine, the combination of escapement devices, a key operated universal bar, a normally open electric circuit containing an electro-magnet connected to certain of said escapement devices, a device operated by said universal bar for closing said circuit and energizing said magnet, and means for rendering said device inoperative during its movement.

20. In a typewriting machine, the combination of escapement devices, a key operated universal bar, a normally open electric circuit containing an electro-magnet connected to certain of said escapement devices, a tripping device operated by said universal bar for closing said circuit and energizing said magnet, and means operating automatically to trip said device to open said circuit.

21. In a typewriting machine, the combination of escapement devices, a key operated universal bar, an electric circuit provided with normally separated contact devices, an electro-magnet in said circuit and connected to certain of said escapement devices, a tripping device operative by said universal bar to bring said contact devices into engagement to close said circuit, and an abutment in the path of said tripping device to trip the same and free said contact devices.

22. In a typewriting machine, the combination of escapement devices, a key operated universal bar, normally separated electrical contact devices, a spring-pressed tripping device pivotally supported on said universal bar and operative by said universal bar to cause said contact devices to engage to close the circuit, and a fixed abutment operative to cam said tripping device to release said contact devices.

23. In a typewriting machine, the combination of type bars, manually controlled key levers connected to said type bars, escapement devices, a member connected to certain of said escapement devices, a universal bar having a lost motion connection with said member and movable by said key levers, an electro-magnet connected to said member, and means controlled by said universal bar for energizing said magnet to move said member, the construction being such that the universal bar may first communicate movement to said member and subsequently said member after the magnet is energized may communicate movement to said universal bar.

24. In a typewriting machine, the combination of escapement devices, a member

connected thereto, a key operated universal bar connected with said member, an electro-magnet adapted to be energized under control of said universal bar, and connections between said member and said magnet, said member after the magnet has been energized being adapted to move said universal bar to break the circuit and deenergize said magnet.

25. In a typewriting machine, the combination of type bars, key levers connected to actuate the same, escapement devices, an electro-magnet, and mechanism operative by said key levers to actuate said escapement devices by energizing said magnet during the depression of any key lever and by subsequently deenergizing said magnet during the depression of said key lever, said type bars being substantially manually operated and said escapement devices being substantially electrically operated.

26. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, and mechanical devices for locking the shifted element in shifted position after the release of the shift key.

27. In a typewriting machine, the combination with a platen and type bars which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, and devices operating automatically to lock the shifted element in shifted position after the release of the shift key.

28. In a typewriting machine, the combination with a platen and type bars which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, and a mechanical lock operating automatically to retain the shiftable element in shifted position after the release of the shift key.

29. In a typewriting machine, the combination with a platen and type bars which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, mechanical devices for locking the shifted element in shifted position after the release of the shift key, and means for automatically unlocking said lock.

30. In a typewriting machine, the combination with a platen and type bars which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, a mechanical lock operating automatically to retain the shiftable element in shifted position after the release of the shift key, and means for releasing said shifted element from said lock.

31. In a typewriting machine, the combination with a platen and type bars which

elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, a mechanical lock operating automatically to retain the shiftable element in shifted position after the release of the shift key, and means for releasing said shifted element from said lock, said last named means operating automatically.

32. In a typewriting machine, the combination with a platen and type bars which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, a lock operating automatically to retain the shiftable element in shifted position after the release of the shift key, and means for releasing said shifted element from said lock, said last named means operating automatically when one of the type bars is actuated subsequently to the locking operation.

33. In a typewriting machine, the combination of a platen and type bars which elements are relatively shiftable to change case by devices including a manually operating shift key, of an electro-magnet contained in a circuit having contacts controllable from said shift key, connections between the armature of said magnet and said devices, and a lock cooperative with certain of said devices to retain the shiftable element in shifted position independently of said shift key.

34. In a typewriting machine, the combination of a platen and type bars which elements are relatively shiftable to change case by devices including a manually operating shift key in the key board of the machine, of an electro-magnet contained in a circuit having contacts controllable from said shift key, connections between the armature of said magnet and said devices, and an automatically operating lock normally inoperative but cooperative with certain of said devices to retain the shiftable element in shifted position.

35. In a typewriting machine, the combination of a platen and type bars which elements are relatively shiftable to change case by devices including a manually operating shift key in the key board of the machine, of an electro-magnet contained in a circuit having contacts controllable from said shift key, connections between the armature of said magnet and said devices, and a lock normally inoperative but adapted when in operation to retain the shiftable element in shifted position, the shifted element being releasable from said lock automatically by the operation of a printing key.

36. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a lever, of elec-

trical means for operating said devices, said means being controlled by a key, and a lock inoperative prior to the shifting of said lever coöperative with said lever in its shifted position independent of said key.

37. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a lever, of electrical means for operating said devices, and an automatic lock coöperating with said lever in its shifted position, said lock operating independently of said electrical means.

38. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a lever, of electrical means for operating said devices, a locking lever provided at one arm with means for locking said first named lever in shifted position, printing keys, and means controlled by the printing keys and coöperating with the other arm of said locking lever to release the first named lever from its locked position.

39. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a lever, of electrical means for operating said devices, a locking lever provided at one arm with means for locking said first named lever in shifted position, printing keys, a rock shaft controlled by said printing keys, and means on said rock shaft coöperating with the other arm of said locking lever to release said first named lever.

40. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a lever, of electrical means for operating said devices, a locking lever provided at one arm with means for locking said first named lever in shifted position, a key controlled rock shaft, and an arm on said rock shaft coöperating with the other arm of said locking lever to release said first named lever.

41. In a typewriting machine, the combination of a shiftable platen, devices for shifting the same comprising a rocking frame, an electro-magnet normally deenergized, a lever pivoted on said rocking frame and connected with the armature of said magnet, and means for energizing said magnet and causing said lever to act against a projection on said rocking frame to rock the same and shift the platen.

42. In a typewriting machine, the combination of a shiftable platen, devices for shifting the same comprising a rocking frame, an electro-magnet normally deenergized, a lever pivoted on said rocking frame and connected with the armature of said

magnet, means for energizing said magnet and causing said lever to act against a projection on said rocking frame to rock the same and shift the platen, and a locking lever engageable with another projection on said rocking frame to retain it in shifted position.

43. In a typewriting machine, the combination of a shiftable platen, devices for shifting the same comprising a rocking frame, an electro-magnet normally deenergized, a lever pivoted on said rocking frame and connected with the armature of said magnet, means for energizing said magnet and causing said lever to act against a projection on said rocking frame to rock the same and shift the platen, said means comprising a spring-pressed key lever fulcrumed on said rocking frame and having movement independent thereof to close the electric circuit containing said magnet.

44. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a shiftable frame, of an electro-magnet contained in a circuit normally open and having its armature connected to said shiftable frame, and a key in the key board of the machine for closing said circuit and energizing said magnet, said key operating for the purpose independently of said shift frame.

45. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case by devices including a shift frame, of an electro-magnet contained in a circuit normally open and having its armature connected to said shift frame, a key for closing said circuit and energizing said magnet, said key operating independently of said shift frame, and a lock for said shift frame, said lock being controlled independently of shift frame, and a lock for said shift frame, the instant the latter reaches the shifted position, said lock maintaining said shift frame in shifted position after the release of said key.

46. In a typewriting machine, the combination with a platen and type bars which elements are relatively shiftable to change case by devices including a key controlled shiftable frame, of an electro-magnet contained in a circuit normally open and having its armature connected to said shiftable frame, a lock operating automatically to hold the platen in the shifted position after the release of the shift key, printing keys, and means operated by said printing keys independently of said electro-magnet to render said lock inoperative.

47. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case, of key controlled electrical devices for

effecting such relative shift, and a lock for retaining the shiftable element in shifted position after said electrical devices have been deenergized and the shift key released.

48. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, and an automatically operating mechanical lock for retaining the shiftable element in shifted position after said electrical devices have been deenergized and the shift key released.

49. In a typewriting machine, the combination with a platen and type bars, which elements are relatively shiftable to change case, of key controlled electrical devices for effecting such relative shift, a lock for retaining the shiftable elements in shifted position after said electrical devices have been deenergized and the shift key released, printing keys, and devices automatically operated thereby to render said lock inoperative.

50. In a typewriting machine, the combination of a traveling carriage, a platen thereon, line spacing devices, an electro-magnet, means for energizing the same, connections between the armature of said magnet and said carriage, an abutment carried by said connections, and a cooperating fixed abutment, said abutment co-acting during the carriage return to cushion the arrest of the carriage and effect the operation of the line spacing devices.

51. In a typewriting machine, the combination of a power driven carriage, a platen thereon, a line spacing ratchet wheel connected with the platen, a power controlled carriage restoring lever on the frame of the machine, a pair of connected levers on the carriage, a connection between one of said levers and the carriage restoring lever, a line spacing pawl cooperative with said ratchet wheel, and a connection between the other of said pair of levers and said pawl.

52. In a typewriting machine, the combination of a power driven carriage, a platen thereon, power mechanism for returning the carriage, a lever on the carriage connected with said power mechanism, a second lever

on the carriage, a rod connecting said levers, and a line spacing device cooperative with the platen and connected to said second lever.

53. In a typewriting machine, the combination of a power driven carriage, a platen thereon, a line spacing ratchet wheel connected with said platen, power mechanism for returning the carriage, a lever on the carriage connected with said power mechanism, a second lever on the carriage, a rod connecting said levers, a line spacing pawl connected to said second lever, an abutment on said rod, and a cooperating fixed abutment, said abutments co-acting during the carriage return to cushion the arrest of the carriage and effect the line spacing of the platen.

54. In a typewriting machine, the combination of a power driven carriage, a platen thereon, a key controlled electro-magnet, a carriage restoring lever on the frame of the machine flexibly connected with the armature of said magnet, a pair of levers on the carriage, one of said levers being connected with said carriage restoring lever, a rod connecting said pair of levers, and a platen line spacing device connected with the second of said pair of levers.

55. In a typewriting machine, the combination of a power driven carriage, a platen thereon, an electro-magnet, devices controlled by a key at the front of the machine for energizing said magnet, a carriage restoring lever on the frame of the machine flexibly connected with the armature of said magnet, a pair of levers on the carriage, one of said levers being connected with said carriage restoring lever, a rod connecting said pair of levers, a platen line spacing device connected with the second of said pair of levers, an adjustable abutment on said rod, and a cooperating abutment on the frame of the machine.

Signed at Clayton, in the county of Jefferson and State of New York, this 19th day of August, A. D. 1911.

BYRON A. BROOKS.

Witnesses:

MILO B. HENRY,
G. E. MORSE.