May 19, 1942. W. O. MICHELSEN 2,283,565

TYPEWRITING MACHINE

Filed April 30, 1940 5 Sheets-Sheet 1

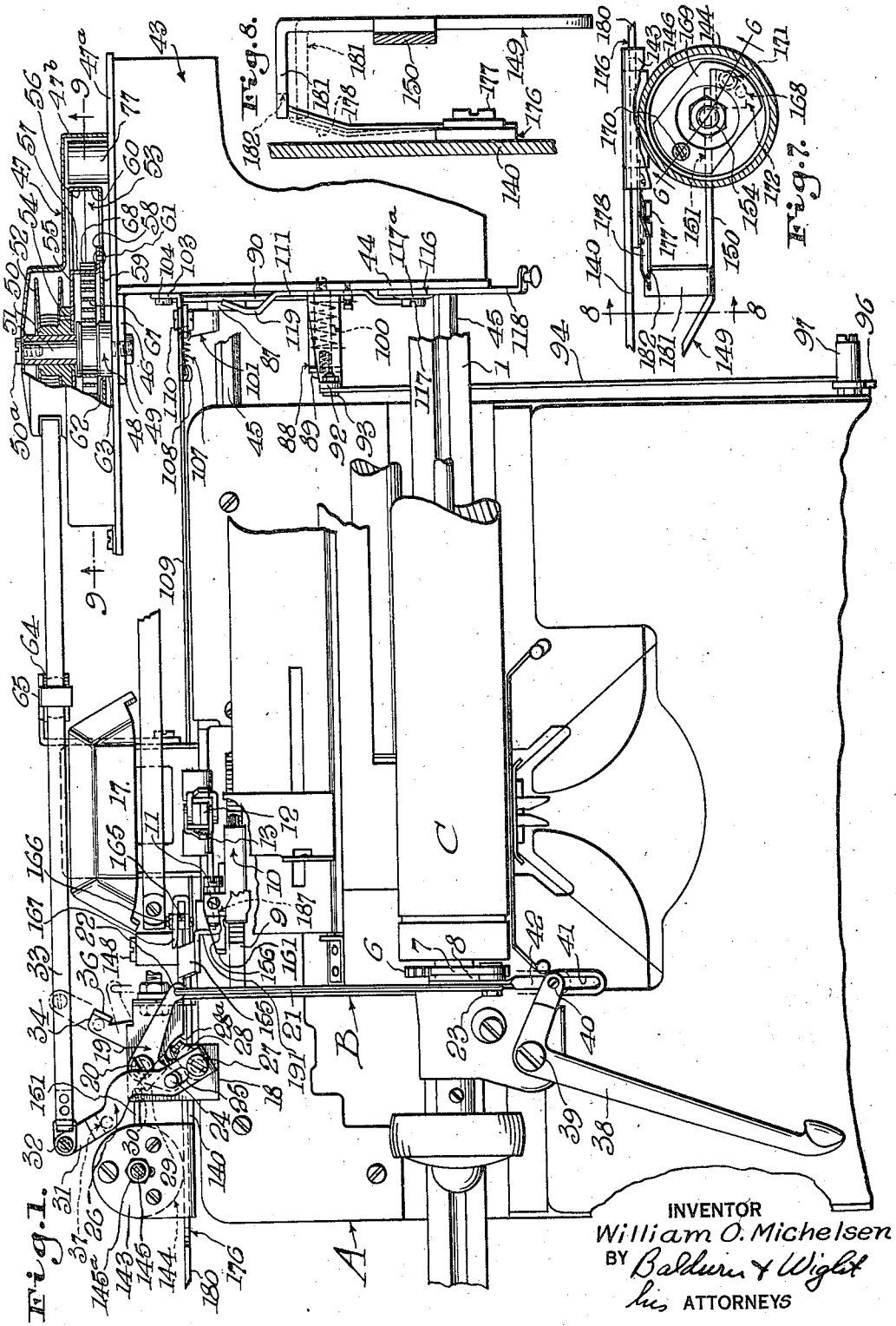


Fig. 1.

Fig. 8.

Fig. 7.

INVENTOR
William O. Michelsen
BY Baldwin & Wight
his ATTORNEYS

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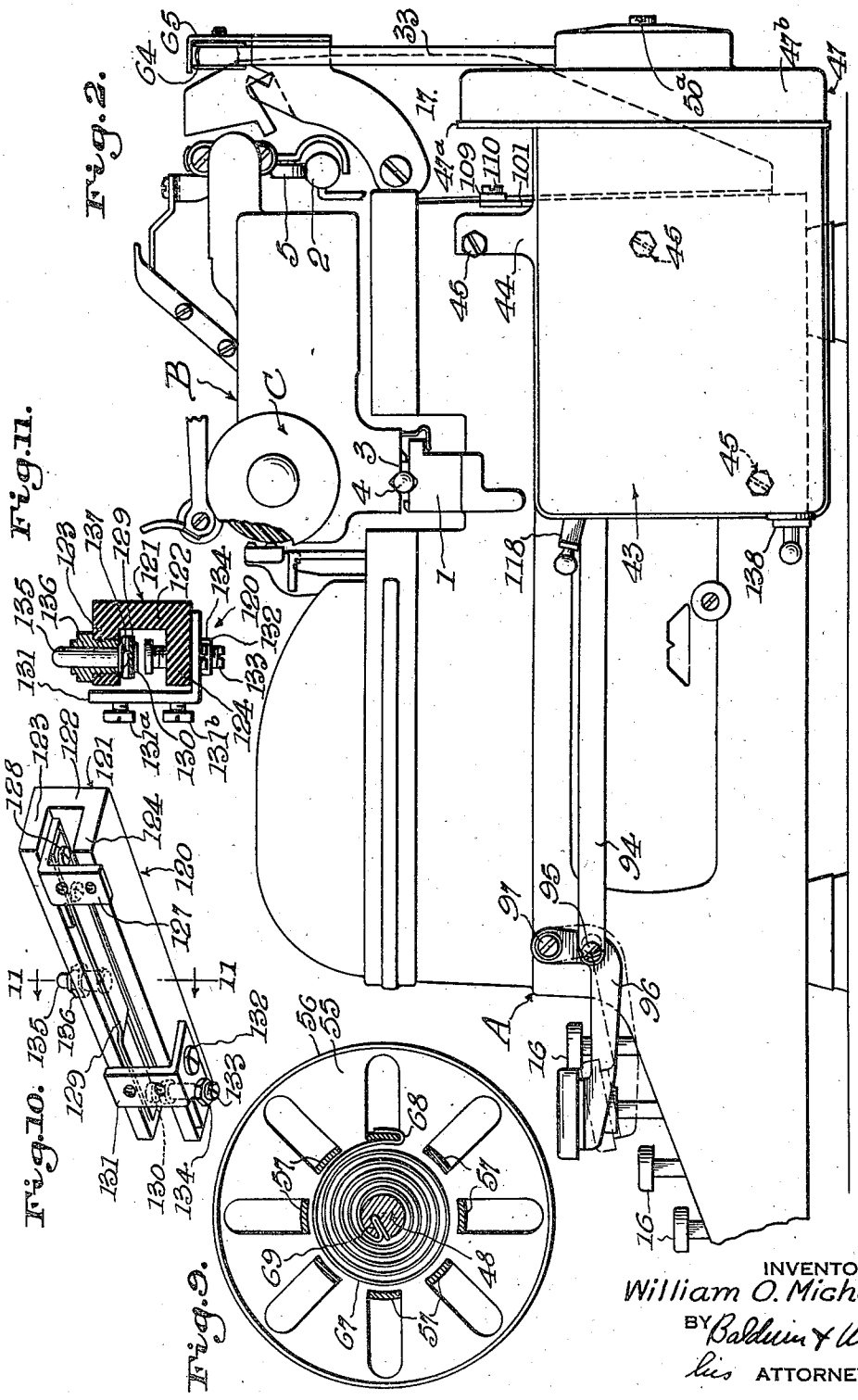


Fig. 2.

Fig. 11.

Fig. 10.

Fig. 9.

INVENTOR
William O. Michelsen
BY Baldwin & Wight
his ATTORNEYS

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TYPEWRITING MACHINE

Filed April 30, 1940 5 Sheets-Sheet 3

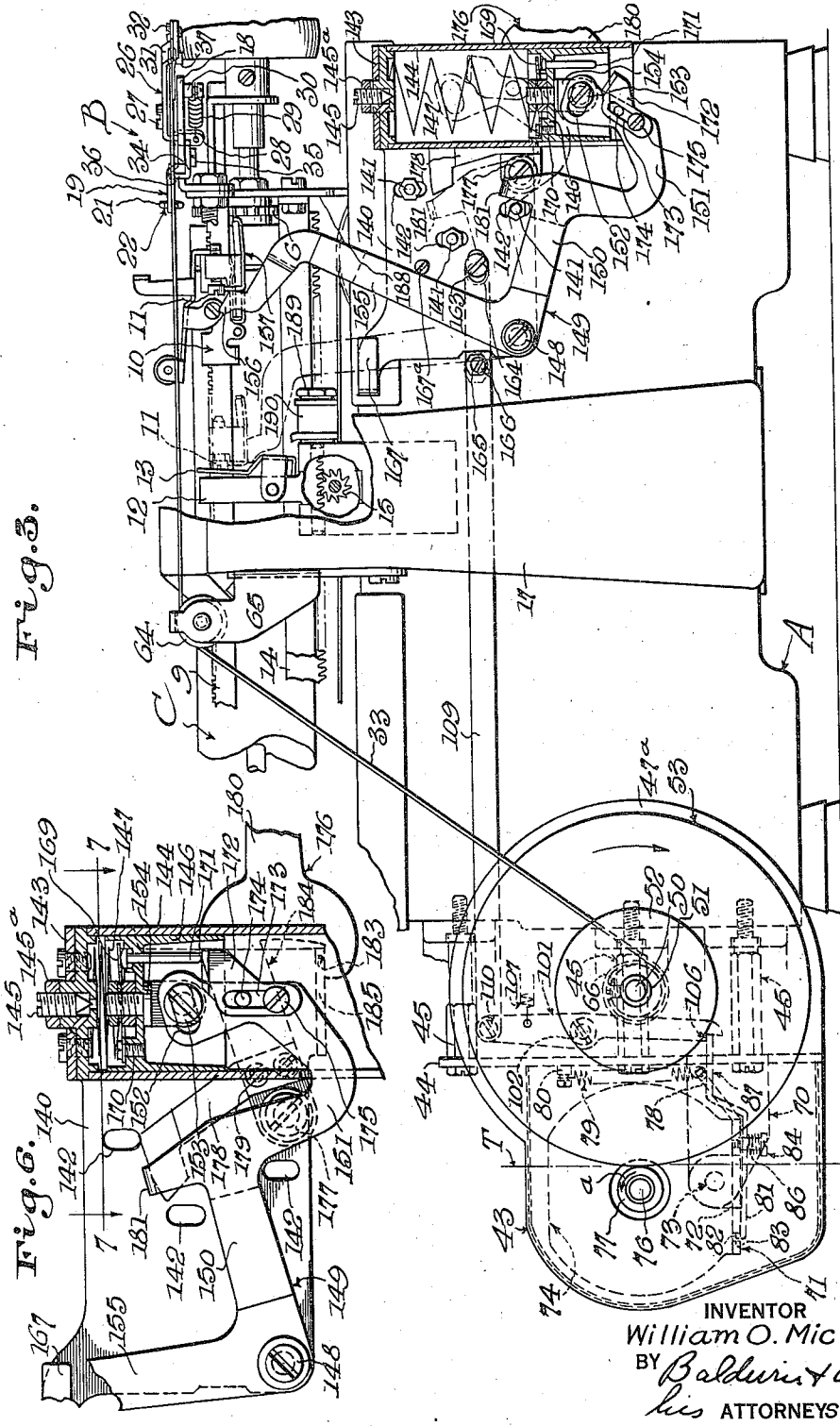


Fig. 3.

Fig. 6.

INVENTOR
William O. Michelsen
BY Baldwin & Wight
his ATTORNEYS

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TYPEWRITING MACHINE

Filed April 30, 1940 5 Sheets-Sheet 4

Fig. 4.

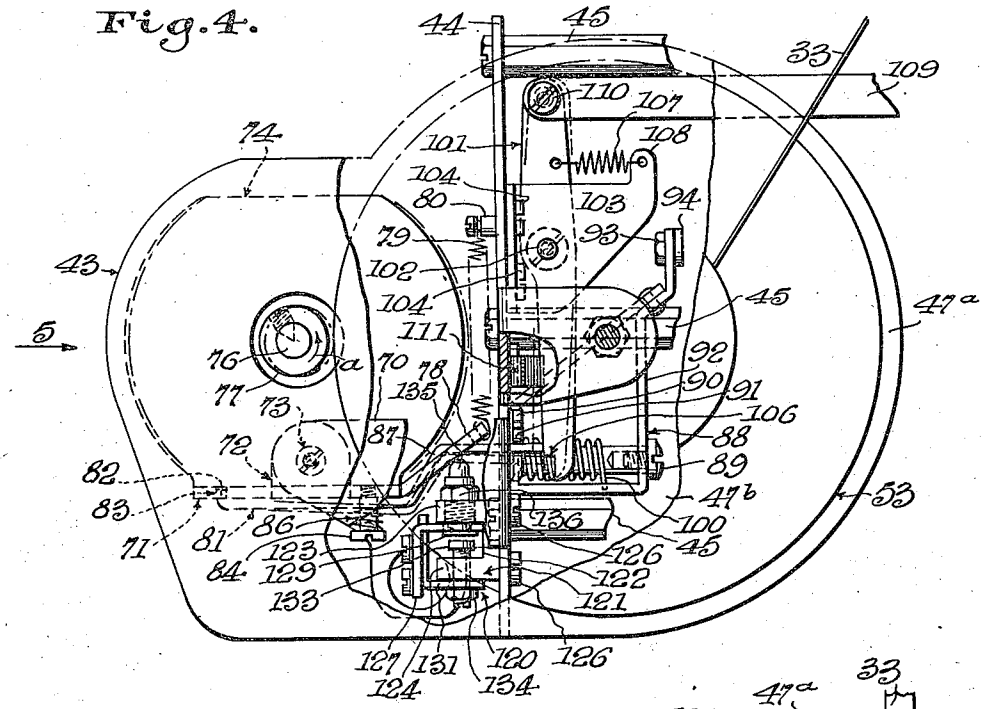
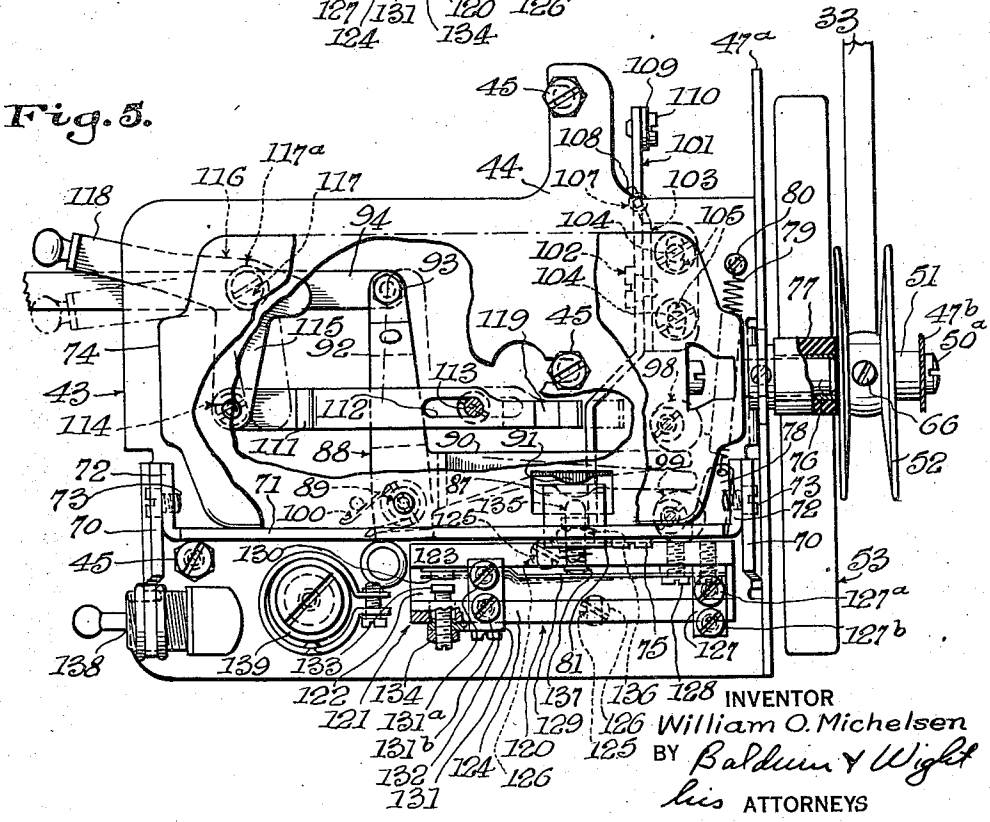


Fig. 5.

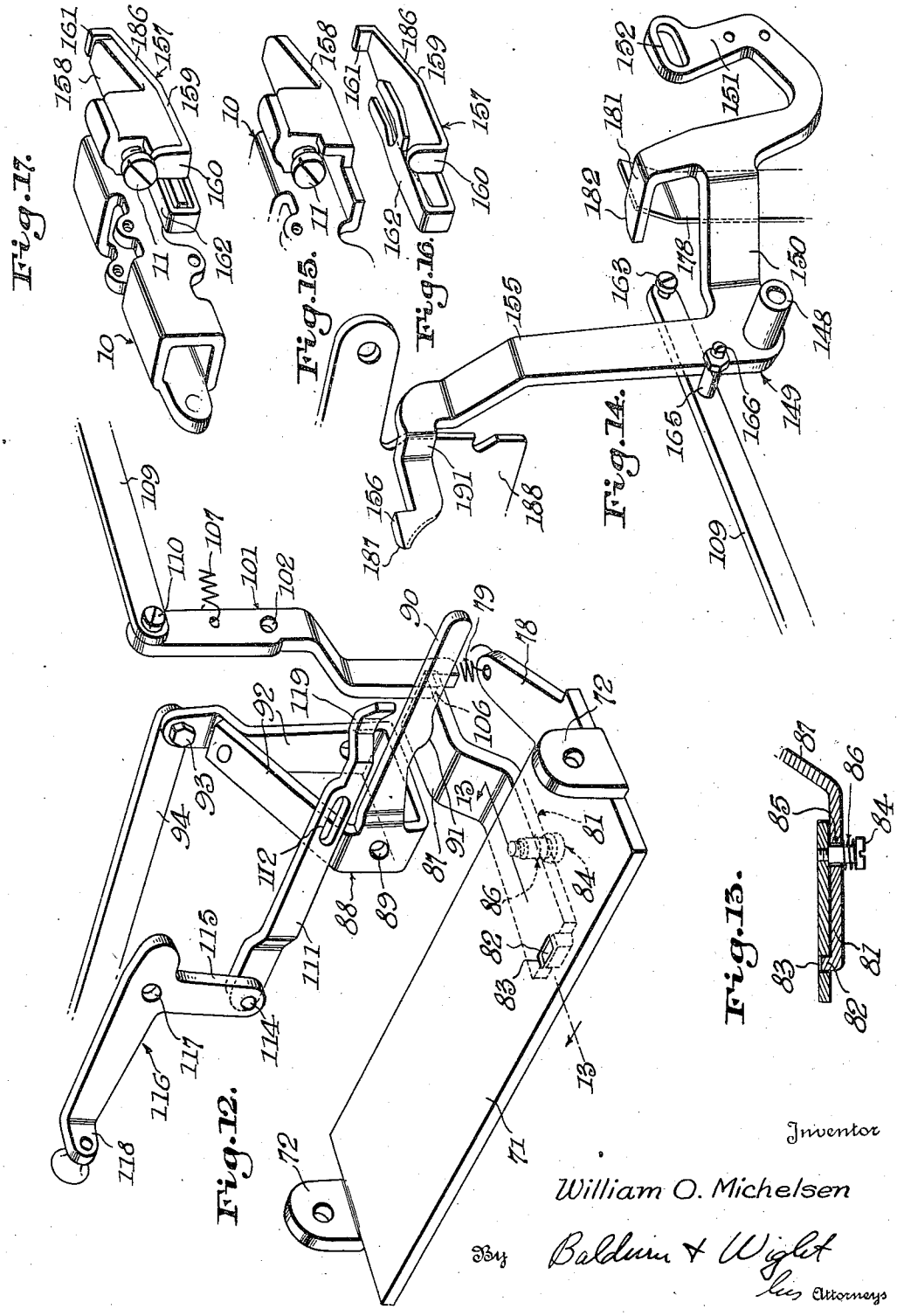


INVENTOR
William O. Michelsen
BY Baldwin & Wight
his ATTORNEYS

May 19, 1942. W. O. MICHELSEN 2,283,565

TYPEWRITING MACHINE

Filed April 30, 1940 5 Sheets-Sheet 5



Inventor

William O. Michelsen

By Baldwin & Wight

his Attorneys

Patented May 19, 1942 2,283,565

UNITED STATES PATENT OFFICE

2,283,565

TYPEWRITING MACHINE

William Otto Michelsen, Woodhaven, N. Y., assignor to Royal Typewriter Company, Inc., New York, N. Y., a corporation of New York

Application April 30, 1940, Serial No. 332,538

32 Claims. (Cl. 197—66)

This invention relates to typewriting machines and more particularly to typewriter carriage driving mechanism, especially carriage return driving mechanism.

An important object of the invention is to provide a simple, sturdy, typewriter carriage return mechanism capable of being inexpensively constructed and readily attached externally to the base frame of a typewriter in such a manner that it will not interfere with the servicing of the usual or standard typewriter mechanism.

Another object is to provide a power-driven typewriter carriage return mechanism controllable by a single key which may be adapted selectively, by means of a finger lever or other selector device, to effect sustained and complete carriage return travel following momentary depressing of the key without its being necessary to hold the key down for any substantial time or, alternatively, to effect sustained carriage return movement only while the key is manually held depressed. In normal operation, the selector device may be set to adapt the key for effecting sustained and complete carriage return movement followed by automatic stopping of the carriage when it reaches the end of its return movement, all effected by merely depressing the carriage return key momentarily. In some instances, however, it is convenient to set the selector device to adapt the carriage return key to effect sustained carriage movement only during the time the key is held depressed. With this latter arrangement the power-driven carriage return mechanism may be coordinated efficiently and conveniently with the use of tabulating mechanism such as is provided in standard typewriters. Thus, during tabulating operations, the carriage return key is held depressed to effect return of the carriage to a point just beyond the particular tabular stop which is to function in the setting of the carriage for the next tabulating operation, and the carriage return key is then released, bringing the carriage to rest before it moves on to the extreme limit of its return travel. The usual tabular key is then depressed, causing the carriage to move a relatively short distance in letter spacing direction before it is arrested by the tabular stop. It is apparent that by this arrangement considerable time is saved due to eliminating the useless continuing of the carriage to the limit of its return movement.

A further object is to provide an improved shock absorbing means adapted to retard the carriage as it approaches the end of its return travel but the retarding action of which ceases or is greatly reduced just prior to the carriage's reaching the extreme limit of its return travel, that is, just prior to the engagement of the carriage-mounted margin stop with the frame-mounted center stop.

Another object is to provide shock absorbing means adapted to be effective for retarding the carriage only when the carriage is moved relatively rapidly and being ineffective to retard the carriage substantially when the carriage is moved relatively slowly, as by hand.

Another object is to provide an improved and durable mechanism for transmitting drive from an electric motor or other power source to a typewriter carriage for effecting return movement of the carriage, the drive connections being simple, certain in operation and free from gears, special clutches, and other parts requiring expensive machining, fitting and assembling operations.

Other objects will become apparent from a reading of the following description, the appended claims, and the accompanying drawings, in which:

Figure 1 is a plan view showing conventional parts of a typewriter with line spacing mechanism and with carriage return mechanism embodying the invention attached thereto;

Figure 2 is an end elevation of the typewriter and mechanism shown in Figure 1;

Figure 3 is a partial rear view, mainly in elevation but with some parts in section, showing power-operated carriage return mechanism and carriage retarding or braking mechanism;

Figure 4 is a rear elevational view of power driving and control mechanism with parts broken away and some parts shown in section;

Figure 5 is a view in end elevation looking in the direction of the arrow 5 in Figure 4, with some parts broken away and others shown in section;

Figure 6 is a fragmentary view, partly in elevation and partly in section, showing carriage retarding or braking mechanism, the section being taken on the line 6—6 of Figure 7;

Figure 7 is a fragmentary view, partly in top plan and partly in section, the section being taken on the line 7—7 of Figure 6;

Figure 8 is a vertical section taken on the line 8—8 of Figure 7 and drawn on an enlarged scale;

Figure 9 is a section, taken on the line 9—9 of Figure 1, showing a driven friction wheel or drum and associated spring, other parts being omitted;

Figure 10 is a perspective view of a control switch;

Figure 11 is a section taken on the line 11—11 of Figure 10;

Figure 12 is a perspective view, on an enlarged scale, of certain operating parts comprising the carriage return control mechanism illustrated in Figures 4 and 5, the housing and supporting parts being omitted;

Figure 13 is a section on the line 13—13 of Figure 12;

Figure 14 is a perspective view drawn on an enlarged scale showing a brake arm bell crank and associated parts;

Figure 15 is a fragmentary perspective view of a part of a margin stop;

Figure 16 is a perspective view of a clip slide wear-resisting margin stop attachment; and

Figure 17 is a perspective view of a margin stop body with the clip slide attachment affixed thereto.

Mechanism embodying the invention in one illustrative form is shown in the drawings as being applied to a Royal Standard typewriter of well known construction, it being understood that mechanism embodying the invention may be used in connection with typewriters of other kinds. The typewriter shown includes a frame A provided with a bottom rail 1 and a rear rail 2 which mount the carriage B for letter spacing and return movements. The carriage is provided with the usual top rail 3 supported on the bottom rail 1 by means of ball bearings 4, and is equipped with rollers 5 adapted to roll upon and support the carriage on the rear rail 2. A platen C, rotatably mounted on the carriage in a known manner, is equipped with a ratchet wheel 6 arranged to cooperate with a pawl 7 carried by a rock arm 8 adapted to be rocked in the usual manner for effecting line spacing movements of the platen. A margin stop bar 9, supported at the rear of the carriage, mounts the usual margin stops, one (10) of which is shown as being of a known construction which includes an abutment screw 11 adapted to engage a center stop 12 and buffer 13 thereon when the carriage reaches the end of its return movement. An escapement rack 14, supported on the carriage, is in mesh with an escapement pinion 15, rotation of which is controlled by suitable escapement mechanism, not shown. Keys 16 are arranged to effect operation of the usual and known kinds of typewriter mechanism which includes tabulating mechanism, not shown, but parts of which are housed within a tabular finger cover 17. The parts thus far described are of known form and some other parts shown in the drawings, but not specifically referred to by reference characters herein, will readily be recognized as constituting the usual typewriter equipment and construction.

Figures 1 and 3 illustrate mechanism for effecting line spacing movements of the platen automatically just prior to the commencement of each return movement of the carriage, such mechanism being generally similar to line spacing mechanism disclosed and claimed in the copending application of William O. Michelsen, Serial No. 260,841, filed March 9, 1939, now Patent No. 2,258,211, issued October 7, 1941. The line spacing mechanism shown herein includes a bracket or shelf 18 secured to the typewriter carriage and serving to mount a bell crank lever 19 pivotally mounted on the shelf as at 20. A link 21, pivotally connected to the bell crank lever 19 as at 22, extends forwardly for pivotal connection at 23 to the line spacing rock arm 8. A roller 24 on the bell crank lever 19 extends up through an oblong slot 25 formed in a bell crank lever 26 pivoted as at 27 on the shelf 18, the arrangement being such that rocking of the bell crank lever 26 will, through the roller and slot connection 24—25, effect rocking of the bell crank lever 19, thrusting of the link 21, and rocking of the line spacing arm 8 and pawl 7. The short arm 28 of the bell crank lever 26 is bent so as to pass downwardly through a slot 28a in the shelf 18 below which it is connected to one end of a spring 29, the other end of which is connected to a post 30 mounted on the under side of the shelf 18. The long arm 31 of the bell crank lever 26 is connected at 32 to a draw band 33 adapted to be pulled or drawn to the right, as viewed in Figure 1, after the completion of the typing of a line for effecting, first, the line spacing movement of the platen and then the pulling of the carriage to the right or in the return direction. A stop arm 34 is adjustably secured to the shelf by means of a screw 35 and is provided with an ear 36 adapted to be engaged by a pin 37 on the arm 31 of the bell crank lever 26 when the lever is swung in a clockwise direction as viewed in Figure 1. To provide for manual line spacing of the platen C when desired, a line spacing handle 38 is pivoted on the carriage as at 39 and is provided with a pin 40 which extends into a slot 41 in a link 42 pivotally connected to the line space rock arm 28 at 23.

In operation, when a typed line has been completed, mechanism for drawing the band 33 to the right is set in operation, in a manner to be described, so as to pull the band 33 and rock the bell crank lever 26 clockwise until the pin 37 engages the ear 36 on the stop arm 34. During this rocking of the bell crank lever 26, the bell crank lever 19 will be rocked counterclockwise, thereby rocking the arm 8 which, through the pawl 7 engaging the ratchet wheel 6, imparts rotary line spacing movement to the platen. It will be observed that the power operated actuation of the line spacing mechanism will not move the line space handle 38, the handle being permitted to remain at rest by the pin and slot lost motion connection 40—41. When the rocking of the bell crank lever 26 is arrested by engagement of the pin 37 with the stop arm ear 36, further movement of the band 33 will draw the carriage to the right.

The present invention relates more particularly to improved power operated mechanism for drawing or pulling the band 33 and for controlling the driving and retarding of the carriage as will now be described. A mechanism housing generally designated 43 is provided with a mounting plate 44 which is supported on the frame A of the machine by three studs or posts 45. The plate 44 is formed with a flange 46 which supports a friction drum and winding reel housing 47 comprising a plate 47a and a cover 47b. A pintle 48 is secured to the flange 46 and plate 47a by means of a nut 49 and is formed with a reduced outer end 50 to which the cover 47b is secured by a screw 50a. A self-oiling bearing sleeve 51, surrounding the reduced pintle portion 50, mounts a winding reel 52 and a driven friction wheel or drum 53 which is secured to the winding reel 52 by rivets 54. The drum 53 is shown as being formed in two parts, the first part comprising a disc 55 having a peripheral flange 56 and having eight fingers 57 struck down from the web of the disc, each finger being formed

with an attaching lug 58. The second part of the drum 53 comprises a disc 59 formed with a peripheral flange 60 which matches and is concentrically aligned with and in abutting relation with the flange 56. Rivets 61 passing through the web of the disc 59 and the lugs 58 secure the two drum parts in assembled relation. The disc 59 is formed with an opening 62 which clears an enlarged part 63 of the pintle free from contact therewith so that the entire assembly of the winding reel 52 and friction drum 53 is journaled on the self-oiling bearing 51.

The draw band 33 extends from the bell crank 26 over a guide pulley 64 journaled on a bracket 65 mounted on the tabular finger cover 17 and is wound on the reel 52, being secured thereto by a screw 66. A clock type spring 67, anchored as at 68 to one of the fingers 57, is secured to the pintle as at 69, the arrangement being such that the spring constantly tends to rotate the drum 53 and reel 52 in a direction to maintain the draw band 33 taut irrespective of the position of the carriage on the frame.

Referring now to the mechanism for rotating the friction wheel or drum 53 and the reel 52, the mechanism housing plate 44 is provided with two ears or standards 70 on which a cradle 71 is rockably mounted by lugs 72 supported by pivot screws 73. An electric motor 74, secured to the cradle 71 by mounting screws 75, has a shaft 76 provided with a driving friction wheel 77 much smaller than the driven friction wheel or drum 53 and preferably being formed of suitable resilient material, such as rubber. The cradle 71 is provided with an extension or ear 78 to which is connected one end of a coil spring 79 anchored at its outer end on a post 80 fixed to the mounting plate 44. Normally, the spring 79 holds the ear 78 up and thus holds the cradle 71 and the motor 74 in a position such that the friction wheel 77 is out of engagement with the friction wheel 53. Control mechanism is provided for rocking the cradle and the motor 74 from non-drive effecting position to drive effecting position in which the driving friction wheel 77 frictionally engages the driven wheel 53, the control mechanism also preferably being adapted to start the motor just after engagement of the wheels 77 and 53 has been effected. In the control mechanism shown, an arm 81 underlying the cradle 71 is formed with an ear 82 which extends up into an opening 83 in the cradle 71 to form a pivotal connection between the arm 81 and the cradle. Spaced from the pivot connection 81—83 is a spring anchor screw 84 which extends through an opening 85 in the arm 81 and has threaded connection to the cradle 71. A spring 86, interposed between the head of the screw 84 and the arm 81, tends to urge the arm up against the cradle 71 and, conversely, tends to draw the cradle and motor down against the arm 81. The arm 81 is formed with an extension 87 adapted to be engaged and moved downwardly by other mechanism to be described for rocking the cradle and motor to drive effecting position, the arm 81 with its extension 87 therefore constituting a master control member.

As previously stated, the cradle 71 and motor normally are held by the spring 79 in non-drive effecting positions. For pressing down on the extension 87 of the arm 81 to move the cradle and motor to drive effecting positions, a bell crank lever 88 is pivotally mounted as at 89 and is formed with an arm 90 having a swell portion 91 positioned above the extension 87 of the arm 81. The other arm 92 of the bell crank lever 88 is pivoted as at 93 to the rear end of a thrust link 94, the front end of which is pivotally connected as at 95 to a carriage return key 96 pivoted on the frame A by means of a screw 97. In operation, when the key 96 is depressed, the link 94 is thrust rearwardly rocking the bell crank lever 88 clockwise, as viewed in Figure 5, and causing the swell 91 to depress the extension 87 and rock the arm 81, the cradle 71 and the motor clockwise, as viewed in Figures 3 and 4, thus bringing the driving friction wheel 77 into drive effecting engagement with the driven friction wheel 53. Adjustable eccentrics 98 and 99 are positioned respectively above and below the free end of the arm 90 of the bell crank lever 88 for limiting the rocking movement of the lever 88. A wrap spring 100 urges the bell crank 88 to its non-drive effecting position.

It often will be desirable for the carriage to be returned all of the way to the limit of its return movement upon a momentary depressing of the carriage return key 96 without its being necessary to hold the key depressed during the entire carriage return travel. For accomplishing this purpose a holding or latch element 101 is pivotally mounted as at 102 on a bracket 103 mounted for vertical adjustment on the plate 44 by means of screws 104 having threaded engagement with the plate and passing through slots 105 in the bracket 103. The latch is formed with a nose 106 which is adapted to be projected over the extension 87 of the arm 81 under the urge of a spring 107 secured at one end to the upper part of the latch and at its other end to an ear 108 on the bracket 103. The latch 101 normally is free to be rocked by the spring 107 as soon as the extension 87 of the arm 81 is moved below the level of the nose 106, at which time the nose passes over the extension 87 and comes into holding engagement therewith. A thrust link 109 is pivotally connected as at 110 to the upper end of the latch 101 and is adapted to rock the latch against the urge of the spring 107 when the carriage has completed its return movement, movement of the link 109 for rocking the latch being effected by mechanism which will be described later.

Thus, in operation, when the extension 87 of the arm 81 has been pressed downwardly by depressing the carriage return key 96, the spring 107 will rock the latch clockwise, as viewed in Figures 3 and 4, into holding engagement with the extension 87 so that after the carriage return key is released the drive friction wheel 77 will be maintained in drive effecting engagement with the driven friction wheel 53. In some instances, however, as when tabulating operations are to be performed, it is desired to render the latch 101 ineffective. For this purpose selector means are provided for conditioning the control mechanism to effect sustained carriage return movement only during continued depression of the carriage return key 96 or, alternatively, to condition the control mechanism for effecting sustained and complete carriage return movement following only momentary depressing of the carriage return key 96. In the form shown, the selector mechanism includes a bar 111 formed with a slot 112 through which passes a guide screw 113 having threaded engagement with the mounting plate 44. The front end of the bar 111 is pivoted as at 114 to one arm 115 of a selector bell crank 116 pivoted as at 117 under a friction washer 117a on the plate 44 and having

a forwardly extending handle 118 conveniently disposed toward the front of the typewriter. The rear end of the bar 111 is bent as shown in Figure 1 to form a latch engaging portion 119 adapted to be projected into the path of the lower end of the latch when the bar is moved to the rear, as viewed in Figure 1, and to the right, as viewed in Figure 5, by depression of the selector handle 118, the arrangement being such that when the bar 111 is thus shifted, the latch engaging portion 119 will prevent movement of the latch nose into holding position above the extension 87 of the arm 81. The selector 116, held frictionally by the washer 117a, is so mounted that it will be maintained releasably in either of the two positions in which it may be set.

The axis of the motor pivots 73 and the axes of rotation of the friction wheels 77 and 53 are so relatively disposed with relation to the point of engagement of the wheel 77 with the wheel 53 that a tangent T—T common to the two wheels 77 and 53 at their point of engagement passes between the axis of the motor pivots 73 and the axis of rotation of the friction wheel 53. Consequently, rotation of the driving friction wheel 77 in the direction of the arrow *a* in Figures 3 and 4, when the wheel 77 is engaged with the wheel 53, will tend to rock the motor clockwise, as viewed in Figures 3 and 4, so as to hold the wheel 77 in driving engagement with the wheel 53. This holding force, together with the light pressure exerted by the spring 86 which provides a floating connection between the motor and the arm 81, assures the maintaining of proper pressure contact between the wheels 77 and 53 without its being necessary to use a spring 86 capable of exerting the entire force required to hold the two wheels in proper driving pressure contact. The use of a light spring 86, thus made possible, results in requiring a lighter key touch for setting the wheel 77 in proper driving contact with the wheel 53 than would be required if the parts were not so relatively disposed that the rotation of the driving wheel 77 tends to make it hug or pull up against the driven wheel 53.

Although the mechanism for line spacing the platen and returning the carriage may be controlled entirely by the rocking of the motor 74, it is desirable for the motor to be stopped when the friction wheels 77 and 53 are not engaged for effecting carriage return travel. To this end, a switch 120 in circuit with the motor is adapted to be operated automatically so as to start the motor just after the driving wheel 77 has engaged the driven wheel 53, and to stop the motor just before the driving wheel 77 becomes disengaged from the driven wheel 53. The switch 120 includes a channel shaped body 121 of insulating material including a web 122, a top flange 123, and a bottom flange 124. Slots 125 in the mounting plate 44 receive screws 126 having threaded engagement with the body 121 for mounting the switch for vertical adjustment on the plate 44. A metallic connecting member 127 is secured to the switch body by screws 128 which also secure to the member 127 and to the switch body a spring arm 129, having at its outer or free end a contact point 130. Another connecting member 131 is secured to the switch body by a screw 132 and serves to mount a vertically adjustable contact screw 133 adapted to be held in adjusted position by means of a lock nut 134. Normally, the arm 129 is spring-urged by its own resiliency to an elevated position with the contact point 130 thereon disengaged from the contact screw 133. For automatically closing the switch and the motor circuit when the motor is rocked to drive effecting position, a plunger or push rod 135 of non-conducting material is mounted in a bushing 136 secured to the top flange 133 of the switch body, the lower enlarged end 137 of the plunger being disposed above and in contact with the spring arm 129 and the upper end of the plunger being rounded and disposed under and for engagement with the extension 87 of the master control member or arm 81. The connecting member 127 is provided with binding or attaching screws 127a and 127b for connecting the arm 129 and contact point 130 in the motor circuit and to a condenser, respectively. The connecting member 131 is provided with binding or attaching screws 131a and 131b for connecting the contact screw 133 in circuit with the motor and to a condenser, respectively. A cut-off switch 138, likewise, may be connected in circuit with the motor as may be a line resistor element 139 and a condenser and fuse, not shown.

In operation, and assuming the cut-off switch 138 to be closed, the control switch 120 normally would be open so that the motor will not run. When, however, the extension 87 of the master control arm 81 is moved downwardly in the manner already described it will depress the plunger 135 and move the spring arm 129 downwardly to close the contact point 130 upon the contact screw 133 after the driving friction wheel 77 has been moved into drive effecting engagement with the driven friction wheel 53. When the extension 87 of the master control member 81 is allowed to move upwardly, the plunger 135 and spring arm 129 also will be permitted to move upwardly to open the switch 120 before the driving friction wheel 77 has moved to non-drive effecting position.

Mechanism for braking or effecting cushioned retarding and stopping of the carriage as it approaches the end of its return movement is mounted at the left and rear of the typewriter. In the form shown, a plate 140 is secured to the frame A by screws or studs 141 which pass through slots 142 in the plate 140 and have threaded engagement with the frame A, the slots 142 permitting vertical adjustment of the plate 140 in order to align the parts properly. The plate 140 is formed with an ear 143 which is bent rearwardly to form the support for a dash pot cylinder element 144 which is provided at its upper end with an adjustable needle type fluid escape valve 145 held in adjusted position by a lock nut 145a. Mounted for reciprocation in the cylinder 144 is a dash pot piston element 146 urged downwardly by gravity and by a spring 147. Pivoted at 148 on the plate 140 is a bell crank 149, one arm 150 of which is formed with an extension 151 provided with a slot 152 which receives for sliding movement a shoulder screw 153 having threaded connection with a center stud 154 in turn connected to the piston 146. The other arm 155 of the bell crank brake lever 149 constitutes a brake arm, the extreme end portion 156 of which is positioned in the path of the margin stop 10 so as to be engaged by the latter to effect rocking of the bell crank 149 when the carriage approaches the end of its return travel, such rocking causing the piston 146 to move upwardly in the cylinder 144 against the cushion of air or other fluid in the cylinder. Fluid escape valve 145 is so adjusted as to permit a steady

continuous escape of fluid during ascent of the piston by restricting the escape sufficiently to cause the building up of a cushioning fluid pressure tending to yieldably resist rocking of the brake lever 149 and thereby retarding the carriage. Inasmuch as the margin stop 10 must engage the upper end 156 of the brake lever 149 at each return movement of the carriage and will slide on the lever end 156, the parts will be subject to considerable wear. Accordingly, the extreme upper end 156 of the brake lever preferably is hardened and the margin stop 10 is provided with a protective slide or abutment generally designated 157. The construction of the slide 157 and its mode of attachment to the margin stop is illustrated most clearly in Figures 15, 16 and 17. As shown in Figure 15, the margin stop, which may be of known construction, is formed or provided with a lower plate portion 158 which is the portion which would engage the end 156 of the brake arm 149 were the margin stop not provided with a protective member. The protective slide member 157, shown alone in Figure 16, comprises a lower plate portion 159 having upstanding ears 160 and 161. An extension of the plate portion 159 is return-bent over the latter to form a spring finger 162. The slide 157 is clipped to the plate portion 158 of the margin stop with the slide plate 159 disposed below the margin stop plate 158 and with the spring finger 162 disposed above the margin stop plate 158, the ears 160 and 161 holding the slide 157 against longitudinal movement. The slide 157 preferably is formed of hardened spring steel so as to be wear resisting.

In order that the latch 101 of the power drive control mechanism will be disengaged from the master control member 81 to effect stopping of the carriage drive in response to the carriage's reaching the end of its return travel, means are provided for moving the thrust link 109 in response to rocking of the brake lever 149. A screw 163, connected to the link 109, is mounted to slide in a slot 164 in the plate 140 thereby supporting the link 109 for reciprocating movements. An adjustable eccentric bushing 165, having a hexagonal head, is secured to the link 109 by means of a screw 166. The arrangement is such that when the bell crank brake lever 149 is rocked during return movement of the carriage it will engage the bushing 165 to shift the thrust link 109 (to the left as viewed in Figure 3) to rock the latch 101 and disengage the latch nose 106 from the master control member 81. A U-shaped extension 167 at the top of the plate 140 acts as a guide for the brake lever 149 at the end of carriage return movement, and a stop pin 167a limits rocking of the lever 149 by the spring 147.

In accordance with an important feature of the invention, the dash pot is provided with means for releasing pressure built up in the cylinder 144 just prior to engagement of the margin stop 10 with the center stop 12 so as to discontinue the retarding action of the dash pot and assure movement of the carriage completely to the end of its return travel. In the form shown, the piston 146 is provided with a fluid release valve port or opening 168 and with a cooperating flap valve element 169 secured to the top of the piston by a screw 170. The flap valve 169 normally is open and is adapted to be closed by the building up of pressure within the cylinder when the piston is raised relatively rapidly, as it will be during the power effected carriage return movement. Preferably, however, the flap valve element 169 is sufficiently stiff to resist closing during relatively slow raising of the piston 146, such as would take place during a gradual manually effected return movement of the carriage. In order to raise the flap valve 169 just prior to the carriage's reaching the extreme end of its return travel, a pin 171, with its head disposed below the flap valve 169, extends down through the piston web in position to be engaged by an abutment or ear 172 carried by the extension 151 of the lever 149. Preferably, the abutment or ear 172 is formed with a slot 173 receiving a pin 174 secured to the extension 151 and a screw 175 having threaded connection with the extension 151, the arrangement being such that the abutment or ear 172 may be positioned adjustably so as to engage the pin 171 at different times with respect to position of the carriage on the frame. When the carriage reaches a predetermined position, just prior to the engagement of the margin stop 10 with the center stop 12, the abutment 172 will lift the pin 171 and open the fluid release valve 169 so as to permit relatively rapid escape of fluid from within the cylinder 144 and thereby to discontinue the retarding action. Releasing of the fluid pressure takes place at about the same time that the brake arm end 156 slides under the margin stop clip 157 and thus prevents straining or lifting of the margin stop rod by the brake arm. If desired, the flap valve 169 may normally be closed when the parts are at rest but the described arrangement, whereby the building up of some pressure in the cylinder is required to close the flap valve, has the advantage of offering less resistance to slow manual movement of the carriage as sometimes is necessary when it is desired to position the carriage at some intermediate point on the frame.

In some instances it may be desirable to disable the retarding mechanism entirely and, for this purpose, a disabling lever 176 pivotally mounted as at 177 on the plate 140 is provided with a resilient or leaf spring arm 178 secured to the lever by screws 179 and with a handle 180 which extends beyond the typewriter frame A so as to be readily accessible to the operator. Normally, the disabling lever 176 is in the position indicated in full lines in Figure 3, wherein it will have no effect upon the rocking of the bell crank lever 149. When it is desired to disable the retarding mechanism the disabling lever 176 is rocked to the position shown in Figure 6, wherein the upper end of the spring arm 178 is positioned to be disposed under an ear 181 on the arm 150 of the brake lever 149 so as to hold the brake lever in its extreme rocked position. Conjointly, the link 109 will be held in a position in which it will prevent the latch 101 from engaging the master control member 81. The upper end of the spring arm 178 of the disabling lever 176 is inclined as shown in Figures 7 and 8. Consequently, if the disabling lever should be moved to the operative position shown in Figure 6 while the bell crank 149 is in the position shown in full lines in Figure 3 with the piston 146 in its lower position, subsequent rocking of the bell crank lever 149 (counterclockwise as viewed in Figure 3) will cause the ear 181 to engage the inclined face of the spring arm 178, as illustrated in dotted lines in Figure 8, so as to cam the latter away from the ear 181 and permit the ear to move up over the spring arm 178 after which the latter will snap in under the ear 181, as shown in full lines in Figure 8, thereby coming to a position in which it will hold the brake lever 149

against rocking movement. In some instances, the piston 146 may be in partially raised position when it is desired to rock the disabling lever 176 to its operative position. In such case, a tapered corner or beveled edge 182 formed on the ear 181 will cam the leading edge of the spring arm 178 to the left, as viewed in Figure 8, in order to permit the lever 176 to be rocked to its operative position.

In order to limit rocking of the disabling lever 176, it is formed with lower and upper stop surfaces 183 and 184, respectively, adapted to engage a stop ear 185 on the plate 140.

Operation

If it is desired that the drive and control and retarding mechanisms be conditioned to effect sustained carriage return movement upon the momentary depressing of the carriage return key 96 without its being necessary to hold the key depressed, the selector device 118 will be moved to the full line position, shown in Figure 5, so as to withdraw the latch engaging portion 119 of the bar 111 from the path of the latch 101. The disabling lever 176 will be moved to the position shown in full lines in Figure 3 and the cut-off switch 138 will be closed. When the typing of a line has been completed, the carriage return key 96 will be depressed momentarily so as to cause the swell portion 91 on the arm 90 of the lever 88 to press downwardly on the extension 87 of the master control member 81, thereby rocking the motor 74 about its pivots 73 (clockwise as viewed in Figures 3 and 4) bringing the friction wheel 77 into engagement with the friction wheel 53, pressing downwardly on the plunger 135 to close the circuit through the switch 120, and effecting movement of the latch nose 106 over the projection 87 on the control arm 81. The mechanism is so timed that the motor will start after the friction wheel 77 has been placed in operative engagement with the friction wheel 53. Driving of the wheel 53 and the reel 52 will wind up the draw band 33 which first will rock the lever 26 to effect line spacing of the platen in the manner previously described. When the lever 26 is stopped by the stop arm 34 movement of the band 33 will drive the carriage in the return direction. When the carriage reaches a predetermined position during its return travel, the margin stop 10 with the protective slide 157 will engage the upper end 156 of the bell crank 149 so as to rock the latter in response to further carriage return movement, thereby moving the piston 146 upwardly and closing the flap valve 169. The carriage will then continue to move against the resistance of the fluid cushion in the cylinder 144. When the carriage reaches a predetermined position just prior to its arriving at the extreme end of its return travel, corresponding to a distance of about one-fourth of an inch between the margin stop abutment screw 11 and the center stop 12, the ear 172 on the bell crank lever 149 will engage the pin 171 and raise the flap valve 169 so as to effect a quick release of fluid from the cylinder 144, thus allowing the carriage to move the remaining distance without being subjected to any retarding action. When the bell crank lever 149 engages the sleeve 165 on the link 109 just before the end of the carriage return travel, the link is shifted so as to rock and disengage the latch 101 from the extension 87 of the control member 81. The spring 79 will then rock the motor to its non-drive-effecting position and will open the switch 120. The carriage will coast on under its own momentum until the margin stop abutment screw 11 strikes the center stop. The carriage will rebound slightly and come to rest with the margin stop screw 11 in the position indicated in dotted lines in Figure 3.

If it is desired that the driving and control mechanism be conditioned to effect sustained carriage return movement only while the carriage return key 96 is held depressed, for example, to save time in performing tabulating operations, the selector device 118 is rocked to the position shown in dotted lines in Figure 5 so as to project the latch-engaging portion 119 of the bar 111 into the path of the latch 101. To effect a return movement of the carriage the key 96 will be depressed and it will have to be held depressed during the entire time it is desired that the carriage travel in the return direction. Otherwise, the operation will be the same as described above.

If it is desired that the retarding mechanism be disabled or rendered ineffective, the disabling lever 176 is moved to the position shown in Figure 6, so as to place the spring arm 178 under the ear 181, thereby preventing rocking of the bell crank lever 149 and downward movement of the piston 146.

The foregoing recapitulation of the operation has reference to the normal functions performed under most conditions of use. However, in some instances, the left margin stop 10 may be moved to the right of the center stop (as viewed in Figure 1) by pressing the usual margin release key (not shown) to shift the center stop 12 to the rear of the path of the margin stop, after which the carriage may be moved to the right in the return direction either manually or by means of the carriage return mechanism disclosed herein. Also, the left margin stop 10 may be moved to the right past the center stop 12 without moving the carriage by being slid along the rack 9 either manually or by stop-positioning means such as is shown in the copending application of Henry J. Hart, Serial No. 232,869, filed October 1, 1938, now Patent 2,208,367. If the left margin stop is moved to the right of the center stop 12 and thus beyond its normal position of engagement with the brake arm 155, the end 156 of the brake arm will slip from under the slide 157, and the bell crank 149 will be returned to its inoperative position shown in full lines in Figure 3. If writing is then resumed, the left margin stop 10 will approach the end 156 of the brake arm 155 from the right as viewed in Figure 1 and from the left as viewed in Figure 3, and eventually a beveled edge 186 on the slide 157 carried by the margin stop will engage a rounded edge 187 on the end 156 of the arm 155, and will cam the arm end 156 transversely or laterally to the rear out of the plane of rocking a distance sufficient to permit the margin stop 10 and appended slide 157 to proceed to the left as viewed in Figure 3 until the arm end 156 clears the ear 160 on the slide 157, after which the arm end 156 will snap forward again to its normal position in the path of the slide ear 160.

In order to permit this rearward movement of the arm end 156, the arm 155 is yieldable. The U-shaped extension or guide 167 previously referred to serves to steady or support the yieldable arm 155 against lateral deflection during normal operations after the arm end 156 ceases to have contact under pressure with the margin stop slide ear 160.

If the margin release key (not shown) is held depressed or if the left margin stop 10 has been brought to the right of the center stop 12 as described above and the carriage return mechanism then is operated, the carriage will move in the return direction until it comes to a stop in its extreme return position. This extreme limiting stopping may be effected, for example, by engagement of the inside face of the carriage end plate 188 with a pivot screw 189 which mounts a tabular finger set arm hub 190 (see Figure 3). However, before the carriage reaches its extreme position to be stopped by engagement of the end plate 188 with the screw 189, the end plate 188 will engage a portion 191 of the brake arm 155 as shown in Figure 14, thereby rocking the arm counterclockwise as viewed in Figures 3 and 14, thus retarding the carriage, and finally shifting the link 109 to discontinue the carriage return drive in the manner already described.

It will be apparent that mechanism embodying the novel features hereinbefore described possesses the advantage of being free from gears, clutches, and other driving parts requiring accurate machining, fitting, and assembling. The absence of such parts also makes for smooth and quiet operation, and the number of parts, which is very small as compared to prior carriage return mechanisms, renders the construction economical to manufacture and service. The small number of wearing parts also requires very little lubrication. The parts of the carriage drive mechanism are readily accessible and the mechanism is adapted to be applied to existing typewriters in such a manner as not to interfere with the servicing of the usual or standard typewriter parts.

The mechanism disclosed herein embodies the invention in a practical and the at present preferred form, but it will be understood that various changes may be made without departing from the invention as defined in the claims.

I claim:

1. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means comprising a manually operable key, connections between and associated with said key and said power-operated means for effecting operation of said power-operated means and sustained carriage return drive during continued manual depression of said key, selectively operable holding means for maintaining said power-operated means operative to effect sustained carriage return drive following momentary depression of said key, a selector movable to two set positions for rendering said holding means respectively operable or inoperable, and means for mounting said selector for releasably maintaining it in either of its set positions.

2. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means comprising a master control member, a manually operable device for moving said master control member to drive-effecting position, a holding element for maintaining said master control member in drive-effecting position, disabling means operable at will for preventing operation of the holding element to thereby make holding of the master control member in drive-effecting position dependent on said manually operable device, said disabling means including a settable selector adapted when moved to a set position to maintain said disabling means effective for preventing operation of said holding element, and means for releasably holding said selector in said set position.

3. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; mechanism for controlling said power-operated means comprising a manually operable device, said mechanism being adapted to be conditioned for effecting sustained carriage drive only during continued manual holding of said device or to be conditioned for effecting sustained carriage return drive following momentary actuation of the manually operable device, means including a selector movable to two set positions selectively to condition the control mechanism for effecting sustained carriage return drive only during continued manual holding of said device or to condition the control mechanism for effecting sustained carriage return drive following momentary actuation of the manually operable device, and means for releasably maintaining said selector in either of its two set positions, depending upon which it has been moved to.

4. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means comprising a master control member, a manually operable device for moving said master control member to drive-effecting position, a holding element for maintaining said master control member in drive-effecting position, a selector movable to two set positions selectively to disable the holding element and thereby to condition the control mechanism for effecting sustained carriage return drive only during continued manual holding of said device or to enable said holding element and thereby condition the control mechanism for effecting sustained carriage return drive following momentary actuation of the manually operable device, and means for releasably maintaining said selector in either of its set positions, depending upon which it has been moved to.

5. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means comprising a master control member, a manually operable device for moving said master control member to drive-effecting position, a latch movable to inactive position and to active position in which it holds the master control member in drive-effecting position, and selector means including a part normally in a set position in which it permits unobstructed operation of the latch to condition the mechanism for effecting sustained carriage return drive following momentary actuation of the manually operable device, said part being movable to a set position in which it prevents operative engagement of the latch with the master control member to thereby condition the mechanism for effecting sustained carriage return drive only during continued manual holding of said device, and means for releasably maintaining said part in either of

its set positions, depending upon which it has been moved to.

6. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return direction; and mechanism for controlling said power-operated means comprising a master control member movable to drive-effecting and non-drive-effecting positions, a manually operable device for moving said member to drive-effecting position, a latch for releasably holding said member in drive-effecting position, means for retarding the carriage during the last part of its return movement and for releasing said latch at the end of carriage return movement, and disabling means operable selectively to disable only the latch or to disable both the latch and the retarding means.

7. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return direction; and mechanism for controlling said power-operated means comprising a master control member movable to drive-effecting and non-drive-effecting positions, a manually operable device for moving said member to drive-effecting position, a latch for releasably holding said member in drive-effecting position, means for retarding the carriage during the last part of its return movement and for releasing said latch at the end of carriage return movement, means for disabling said latch without disabling said retarding means, and means for disabling said retarding means and locking said latch in released position.

8. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return direction; and mechanism for controlling said power-operated means comprising a master control member movable to drive-effecting and non-drive-effecting positions, a manually operable device for moving said member to drive-effecting position, a latch for releasably holding said member in drive-effecting position, a dash pot device including an element movable against a fluid cushion, a bell crank lever pivoted on said frame and being operatively connected to said movable dash pot element, an abutment on said carriage engageable with said bell crank lever for rocking the latter to move said dash pot element against the fluid cushion when the carriage approaches the end of its return movement, and a thrust link connected to said latch and having a part engageable by said bell crank lever when the carriage is substantially at the extreme end of its return travel for shifting said link and thereby releasing said latch.

9. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return direction; and mechanism for controlling said power-operated means comprising a master control member movable to drive-effecting and non-drive-effecting positions, a manually operable device for moving said member to drive-effecting position, a latch for releasably holding said member in drive-effecting position, a dash pot device including an element movable against a fluid cushion, a bell crank lever pivoted on said frame and being operatively connected to said movable dash pot element, an abutment on said carriage engageable with said bell crank lever for rocking the latter to move said dash pot element against the fluid cushion when the carriage approaches the end of its return movement, and a thrust link connected to said latch and having a part mounted for adjustable positioning on said link and being engageable by said bell crank lever when the carriage is substantially at the extreme end of its return travel for shifting said link and thereby releasing said latch.

10. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means including a margin stop on said carriage, a member movably mounted on said frame and being disposed in the path of the margin stop during carriage return movement, and a hardened metallic protective slide attached to said margin stop for engaging said member to effect movement thereof and control of said power-operated means, said protective slide comprising a lower plate portion extending under the margin stop, ears extending upwardly from said plate portion and adjacent the ends of said margin stop, and a return-bent extension of said plate portion which overlies the margin stop.

11. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means including a bell crank lever pivoted on said frame, a part on the carriage engageable with said lever for rocking it, and a disabling member mounted for movement on said frame and having a spring leaf latch portion adapted when in operative position to extend under a part of said bell crank lever for maintaining said bell crank lever in a position in which it will not be operatively engaged by said carriage part, said bell crank lever part and said latch portion being inclined with respect to each other whereby said bell crank lever part may be moved to a position to be held by said latch portion after the latter has been moved to operative position.

12. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means including a bell crank lever pivoted on said frame, a part on the carriage engageable with said lever for rocking it, an ear on said lever, and a disabling lever pivoted on said frame and having a spring leaf latch portion adapted when in operative position to extend under said ear for maintaining said bell crank lever in a position in which it will not be operatively engaged by said carriage part, said ear and said latch portion being inclined with respect to each other whereby said ear may be moved to a position to be held by said latch portion after the latter has been moved to operative position.

13. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; and dash pot mechanism for cushioning the stopping of the carriage at one end of its travel including a cylinder element, a piston element, and means positively operated in response to carriage movement for relieving pres-

sure in the cylinder when the carriage reaches a predetermined position just prior to its reaching said end of its travel.

14. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; and dash pot mechanism for cushioning the stopping of the carriage at one end of its travel including a cylinder element, a piston element, one of said elements being mounted on the frame, actuating means connected to the other of said elements and being adapted to be operated by carriage movement as the carriage approaches said end of its travel to effect fluid-cushioned movement of the piston relatively into the cylinder and retarding of the carriage, a fluid release valve associated with one of said dash pot elements, and means responsive to arrival of the carriage at a predetermined position just prior to its reaching said end of its travel for opening said release valve.

15. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; and dash pot mechanism for cushioning the stopping of the carriage at one end of its travel including a cylinder element, a piston element, one of said elements being mounted on the frame, actuating means connected to the other of said elements and being adapted to be operated by carriage movement as the carriage approaches said end of its travel to effect fluid-cushioned movement of the piston relatively into the cylinder and retarding of the carriage, a fluid escape valve associated with one of said dash pot elements for permitting steady restricted escape of fluid from the cylinder during relative movement of the piston therein, a fluid release valve associated with one of said dash pot elements, and means responsive to arrival of the carriage at a predetermined position just prior to its reaching said end of its travel for opening said release valve.

16. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; and dash pot mechanism for cushioning the stopping of the carriage at one end of its travel including a cylinder element, a piston element, one of said elements being mounted on the frame, actuating means connected to the other of said elements and being adapted to be operated by carriage movement as the carriage approaches said end of its travel to effect fluid-cushioned movement of the piston relatively into the cylinder and retarding of the carriage, a constantly open fluid escape valve associated with one of said dash pot elements for permitting steady restricted escape of fluid from the cylinder during relative movement of the piston therein, and a fluid release valve associated with one of said dash pot elements and being normally open to permit relatively unrestricted escape of fluid from said cylinder, said release valve being adapted to close in response to pressure built up in the cylinder during only rapid movement of the piston relatively into the cylinder.

17. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; and dash pot mechanism for cushioning the stopping of the carriage at one end of its travel including a cylinder element, a piston element, one of said elements being mounted on the frame, actuating means connected to the other of said elements and being adapted to be operated by carriage movement as the carriage approaches said end of its travel to effect fluid-cushioned movement of the piston relatively into the cylinder and retarding of the carriage, a constantly open fluid escape valve associated with one of said dash pot elements for permitting steady restricted escape of fluid from the cylinder during relative movement of the piston therein, a fluid release valve associated with one of said dash pot elements and being normally open to permit relatively unrestricted escape of fluid from said cylinder, said release valve being adapted to close in response to pressure built up in the cylinder during only rapid movement of the piston relatively into the cylinder, and means responsive to arrival of the carriage at a predetermined position just prior to its reaching said end of its travel for positively opening said release valve irrespective of amount of pressure in the cylinder.

18. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; and dash pot mechanism for cushioning the stopping of the carriage at one end of its travel including a cylinder element, a piston element, one of said elements being mounted on the frame, an abutment mounted on the carriage, a bell crank lever pivoted on the frame and being operatively connected to the other of said dash pot elements, said lever being adapted to be engaged and rocked by said abutment to effect fluid-cushioned movement of the piston relatively into the cylinder and retarding of the carriage when the carriage approaches said end of its travel, a fluid release valve associated with one of said dash pot elements, and means including a part on said bell crank lever for opening said valve when the carriage has arrived at a predetermined position just prior to its reaching said end of its travel.

19. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; power-operated means for moving the carriage in return direction; a stop on said frame; a stop on said carriage engageable with said frame stop for limiting return movement of said carriage; and carriage-retarding mechanism including a cylinder mounted on said frame, a piston reciprocable in said cylinder, an actuating member connected to said piston and being engageable by a part on the carriage when the latter approaches the end of its return travel for moving the piston into the cylinder, movement of the actuating member and travel of the carriage being resisted by building up of pressure in the cylinder, a release valve carried by said piston, and means engageable and movable by said actuating member just prior to engagement of said carriage-mounted stop with said frame-mounted stop for opening said release valve.

20. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; power-operated means for moving the carriage in return direction; a stop on said frame; a stop on said carriage engageable with said frame stop for limiting return movement of said carriage; and carriage-retarding mechanism including a cylinder mounted on said frame, a piston reciprocable in said cylinder, a bell crank lever pivoted on said frame, means connecting the piston to one end of the bell crank lever, the other end of said lever being engageable by said carriage-mounted stop as the carriage approaches the end of its return travel for rocking the bell crank lever and moving the piston into the cylinder, a constantly open fluid escape valve for said cylinder, a fluid release valve for said cylinder including a flap valve element normally in open

position but adapted to be closed by predetermined pressure in the cylinder, and a pin engageable by said lever just prior to engagement of said carriage-mounted stop with said frame-mounted stop for positively opening said flap valve element.

21. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return travel; power-operated means for moving the carriage in return direction; a stop on said frame; a stop on said carriage engageable with said frame stop for limiting return movement of said carriage; and carriage-retarding mechanism including a cylinder mounted on said frame, a piston reciprocable in said cylinder, a bell crank lever pivoted on said frame, means connecting the piston to one end of the bell crank lever, the other end of said lever being engageable by said carriage-mounted stop as the carriage approaches the end of its return travel for rocking the bell crank lever and moving the piston into the cylinder, a constantly open fluid escape valve for said cylinder, a fluid release valve for said cylinder including a flap valve element normally in open position but adapted to be closed by predetermined pressure in the cylinder, a pin for opening said flap valve element, and a pin-operating part adjustably positioned on said lever and engageable with said pin just prior to engagement of said carriage-mounted stop with said frame-mounted stop.

22. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a friction drum, a driving connection between said drum and carriage, a motor pivoted to rock about an axis parallel to the drum axis of rotation, said motor having a shaft with its axis parallel to said drum axis, a friction wheel on the motor shaft, and means for rocking said motor to effect engagement and disengagement of said friction wheel and friction drum, the motor pivot and the point of engagement of said friction wheel and said friction drum being so relatively disposed and the direction of rotation of said friction wheel being such as to cause the driving force exerted by the friction wheel to tend to rock the motor and hold the friction wheel in driving engagement with the friction drum.

23. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a friction drum, a driving connection between said drum and carriage, a motor pivoted to rock about an axis parallel to the drum axis of rotation, said motor having a shaft with its axis parallel to said drum axis, a friction wheel on the motor shaft, a spring yieldably urging said motor to rock to a position in which the friction wheel and drum are out of operative engagement, and means for rocking said motor against the urge of said spring to a position in which the friction wheel and drum are in operative engagement, the motor pivot and the point of engagement of said friction wheel and said friction drum being so relatively disposed and the direction of rotation of said friction wheel being such as to cause the driving force exerted by the friction wheel to tend to rock the motor and hold the friction wheel in driving engagement with the friction drum.

24. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a friction drum, a driving connection between said drum and carriage, a motor pivoted to rock about an axis parallel to the drum axis of rotation, said motor having a shaft with its axis parallel to said drum axis, a friction wheel on the motor shaft, a spring yieldably urging said motor to rock to a position in which the friction wheel and drum are out of operative engagement, means for rocking said motor against the urge of said spring to a position in which the friction wheel and drum are in operative engagement, the motor pivot and the point of engagement of said friction wheel and said friction drum being so relatively disposed and the direction of rotation of said friction wheel being such as to cause the driving force exerted by the friction wheel to tend to rock the motor and hold the friction wheel in driving engagement with the friction drum, and a latch for maintaining said motor in said last named position.

25. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a friction drum, a driving connection between said drum and carriage, a motor pivoted to rock about an axis parallel to the drum axis of rotation, said motor having a shaft with its axis parallel to said drum axis, a friction wheel on the motor shaft, a spring yieldably urging said motor to rock to a position in which the friction wheel and drum are out of operative engagement, and means for rocking said motor against the urge of said spring to a position in which the friction wheel and drum are in operative engagement, the axes of said motor pivot, said motor shaft, and said drum being so disposed that a tangent common to said friction wheel and said drum at their point of engagement passes between said motor pivot axis and said drum axis.

26. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a driven wheel, a carriage-driving connection between said wheel and said carriage, a motor pivotally mounted for rocking movement and having a shaft, a driving wheel on said shaft, an arm movably connected to said motor at a first point and at a point spaced from said first point having a limited floating movement connection to said motor, and means for moving said arm to rock the motor to engage and disengage the driving and driven wheels.

27. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a driven wheel, a carriage-driving connection between said wheel and said carriage, a motor pivotally mounted for rocking movement and having a shaft, a driving wheel on said shaft, an arm pivotally connected to said motor at one point and at a point spaced from said pivotal connection point having a limited floating movement connection to said motor, and means for moving said arm to rock the motor to engage and disengage the driving and driven wheels.

28. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a driven wheel, a carriage-driving connection be-

tween said wheel and said carriage, a motor pivotally mounted for rocking movement and having a shaft, a driving wheel on said shaft, an arm movably connected to said motor at a first point and at a point spaced from said first point having a limited floating movement connection to said motor, a spring for yieldably urging said motor to rock in a direction to effect disengagement of said driving and driven wheels, and an operating member engageable with said arm for rocking it and said motor in the opposite direction to effect engagement of said driving and driven wheels.

29. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; and means for driving the carriage to effect return movements comprising a driven wheel, a carriage-driving connection between said wheel and said carriage, a motor pivotally mounted for rocking movement and having a shaft, a driving wheel on said shaft, an arm pivotally connected at one of its ends to said motor, a spring anchor connected to said motor, a spring interposed between said anchor and an intermediate portion of the arm, and means for pressing the opposite end of the arm to compress the spring and thereby rock said motor to effect engagement of said driving and driven wheels.

30. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return direction; and mechanism for controlling said power-operated means including a lever pivoted on said frame and adapted, when rocked, to stop the carriage return drive, a margin stop on said carriage normally engageable with said lever when the margin stop reaches a predetermined position during the return travel of said carriage for so rocking said lever, and means whereby said margin stop can be moved in carriage return direction beyond its position of engagement with said lever, said lever being yieldable transversely to its plane of rocking and said lever and said margin stop being cooperatively formed to have camming engagement with each other for deflecting said lever laterally out of the path of said stop when said stop is moved in letter-spacing direction after having been moved in return direction beyond its normal position of engagement with said lever.

31. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return direction; and mechanism for controlling said power-operated means including a lever pivoted on said frame and adapted, when rocked, to stop the carriage return drive, a margin stop on said carriage normally engageable with said lever when the margin stop reaches a predetermined position during the return travel of said carriage for so rocking said lever, means whereby said margin stop can be moved in carriage return direction beyond its position of engagement with said lever, said lever being yieldable transversely to its plane of rocking and said lever and said margin stop being cooperatively formed to have camming engagement with each other for deflecting said lever laterally out of the path of said stop when said stop is moved in letter-spacing direction after having been moved in return direction beyond its normal position of engagement with said lever, and a guide on said frame adapted to receive and support against lateral deflection a portion of said yieldable lever when the latter has been engaged by said stop and rocked thereby to drive-stopping position.

32. In a typewriting machine, a frame; a carriage mounted thereon for letter-spacing and return movements; power-operated means for driving the carriage in return movement direction; and mechanism for controlling said power-operated means including a margin stop on said carriage, a member movably mounted on said frame and being disposed in the path of the margin stop during carriage return movement, and a protective slide clip-attached to said margin stop for engaging said member to effect movement thereof and control of said power-operated means, said protective slide comprising a plate portion adapted to lie against a surface of the margin stop and a spring finger extending from said plate portion and over an opposed surface of the margin stop.

WILLIAM OTTO MICHELSEN.