

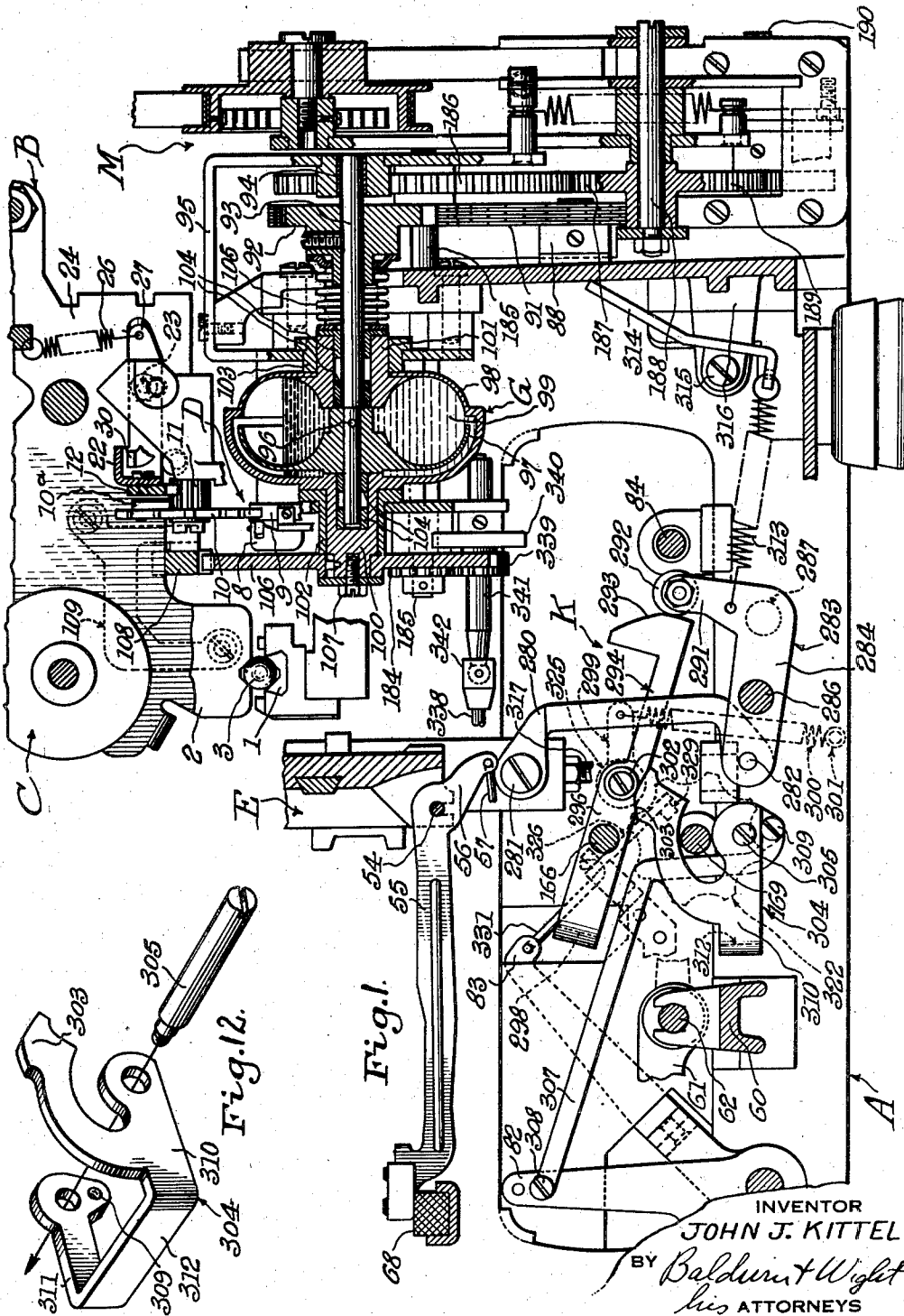
Aug. 21, 1945.

J. J. KITTEL

2,383,259

TYPEWRITING MACHINE

Original Filed July 3, 1943 5 Sheets-Sheet 1



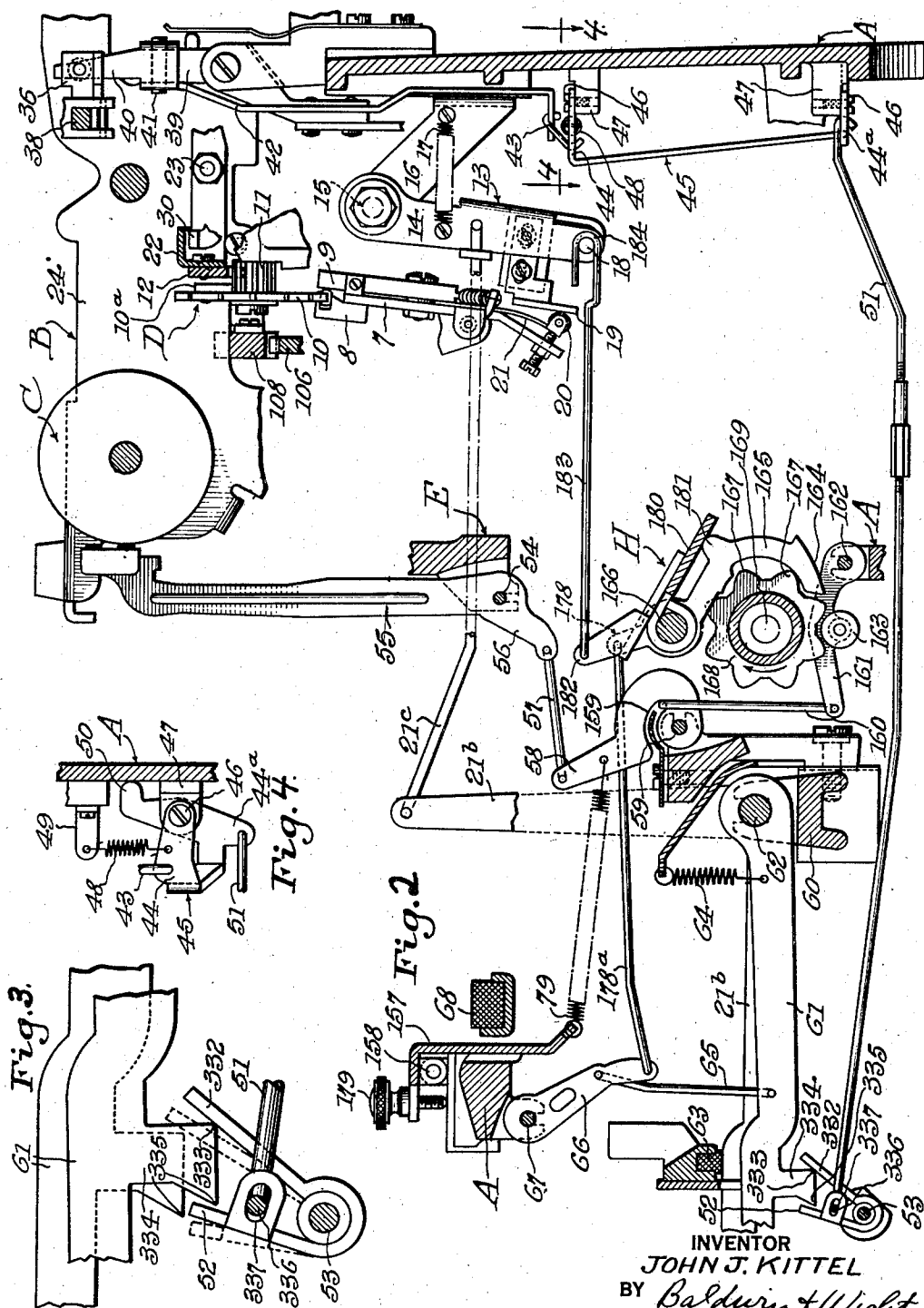
Aug. 21, 1945.

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2,383,259

TYPEWRITING MACHINE

Original Filed July 3, 1943 5 Sheets-Sheet 2



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Aug. 21, 1945.

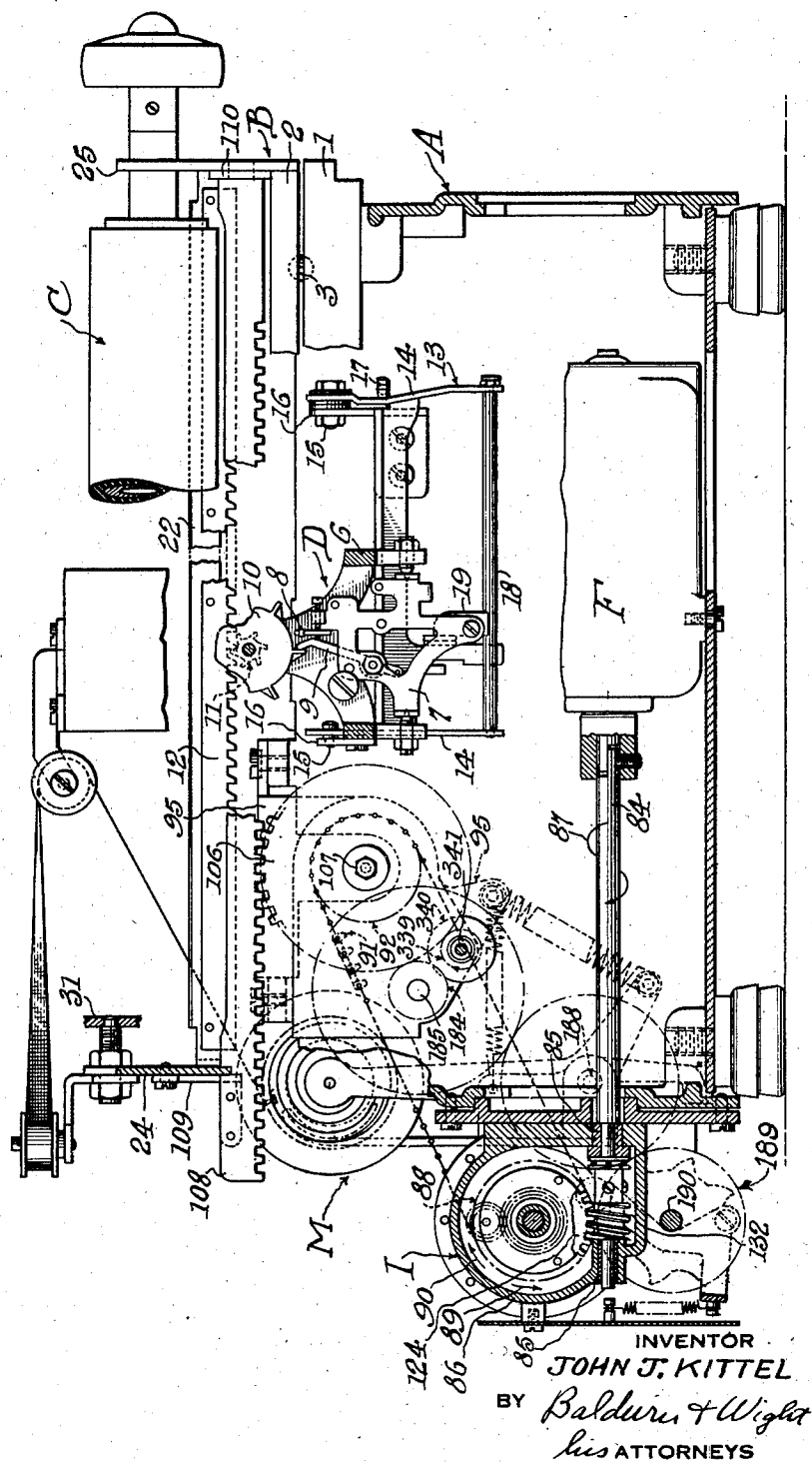
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2,383,259

TYPEWRITING MACHINE

Original Filed July 3, 1943 5 Sheets-Sheet 3

Fig. 5.



Aug. 21, 1945.

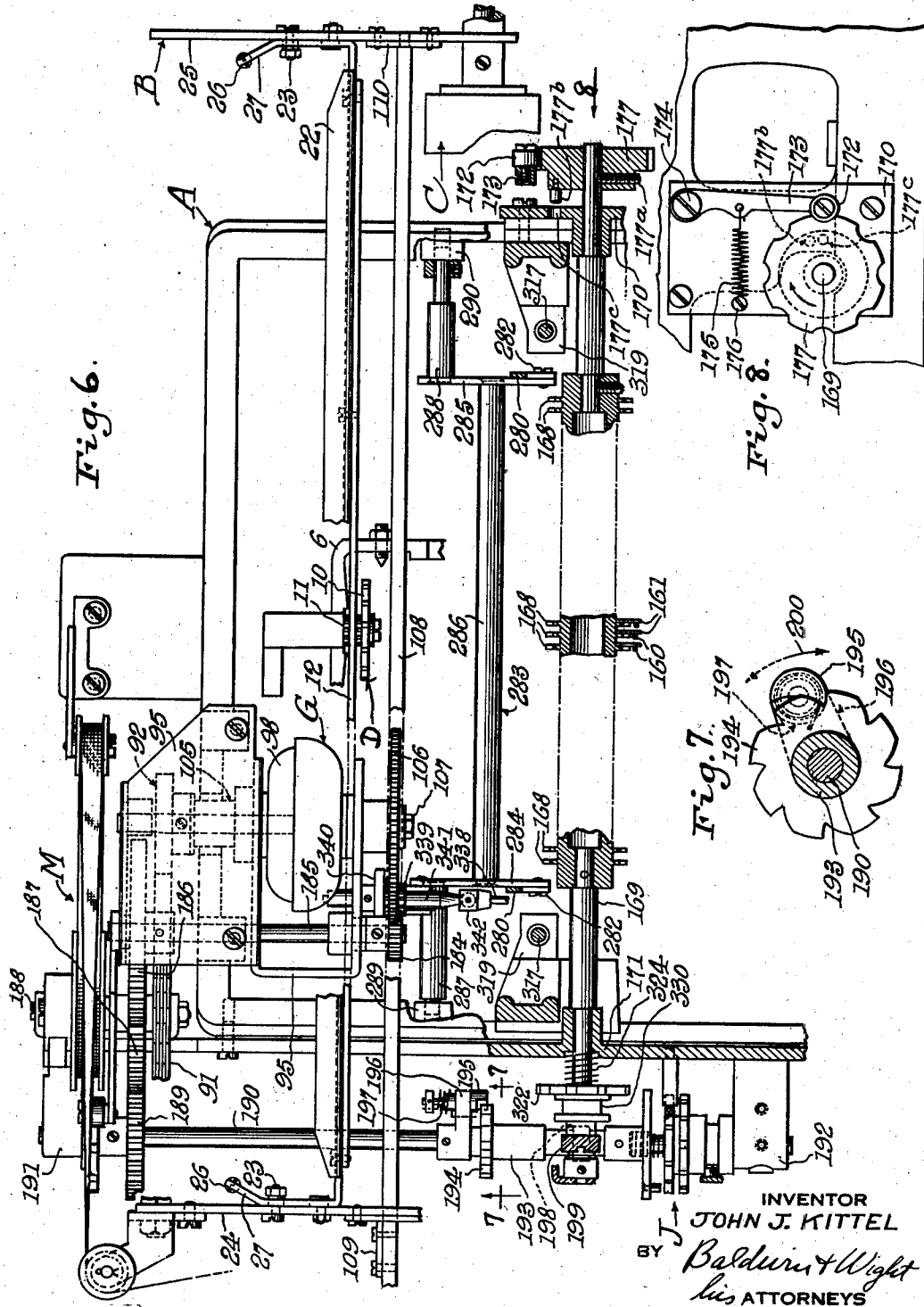
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2,383,259

TYPEWRITING MACHINE

Original Filed July 3, 1943

5 Sheets-Sheet 4



Aug. 21, 1945.

J. J. KITTEL

2,383,259

TYPEWRITING MACHINE

Original Filed July 3, 1943 5 Sheets-Sheet 5

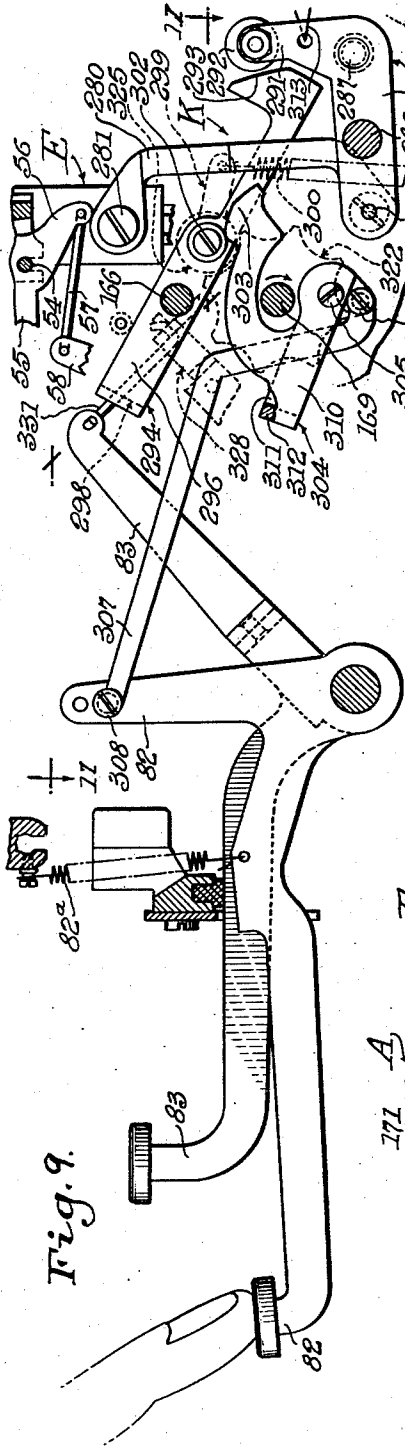


Fig. 9.

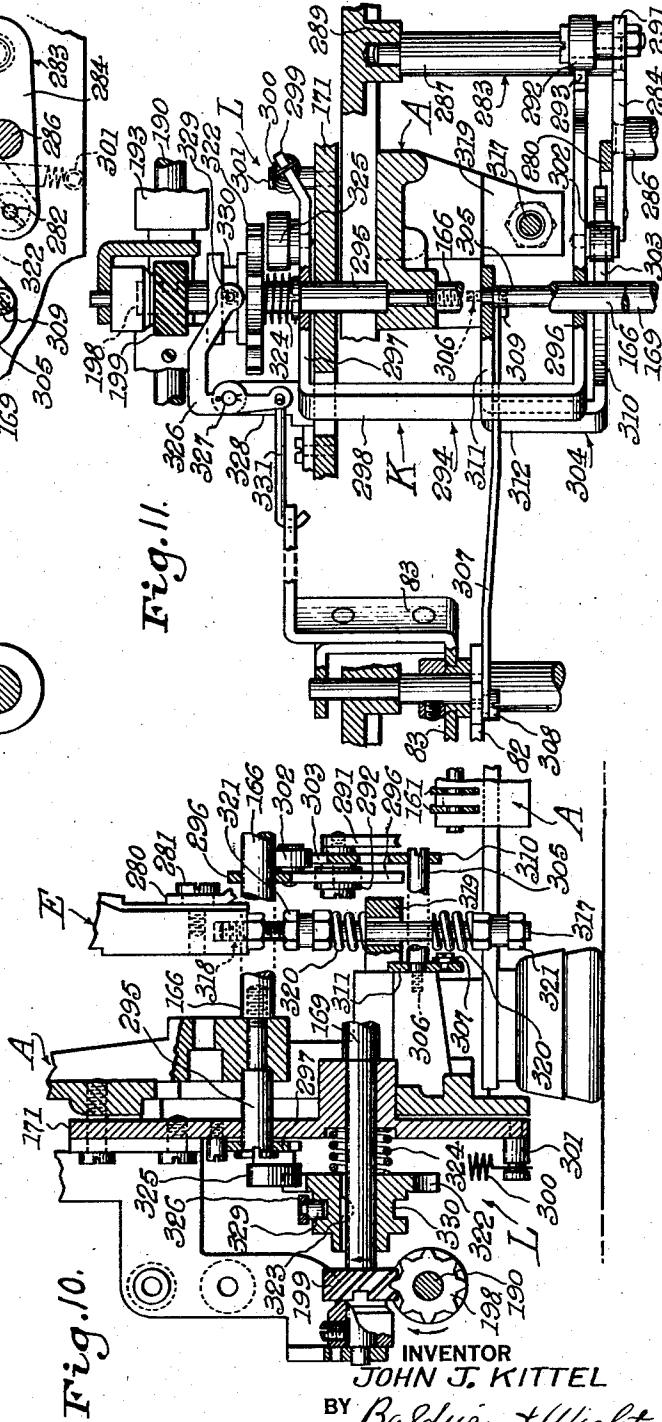


Fig. 10.

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UNITED STATES PATENT OFFICE

2,383,259

TYPEWRITING MACHINE

John Joseph Kittel, St. Albans, N. Y., assignor to
Royal Typewriter Company, Inc., New York,
N. Y., a corporation of New York

Original application July 3, 1943, Serial No.
493,450. Divided and this application March 4,
1944, Serial No. 525,059

14 Claims. (Cl. 197—74)

This invention relates to typewriting or like machines, and more particularly to machines of this class in which mechanism usually operated by manual effort is operated by power supplied by a motor or motors, under manual control.

This application is a division of my co-pending application Serial Number 493,450, filed July 3, 1943.

An object of the invention is to provide a power operated typewriter or like machine in which the power supplying and manual control mechanism is so arranged and so interconnected with other parts of a standard or more nearly standard kind customarily embodied in manually operated typewriters that the power and control mechanism may be operatively associated with such other parts with a minimum of modification of the basic machine construction.

Another object is to provide a machine of the class referred to with improved power drive mechanism for actuating, under manual control, parts performing usual typewriter functions, especially case shifting.

Another object is to provide a typewriter or like machine of the character referred to in which the power for actuating or controlling the actuation of the parts performing some of these operating functions is transmitted through a fluid coupling having the property of cushioning the operating effort and reducing shock.

Another object is to provide a typewriter or like machine having case shifting mechanism including means for impositively transmitting shifting force or effort to a case shifting element for moving it to one of its positions.

Another object is to provide case shifting mechanism of the character stated in which the effort for moving the shifting element to one of its positions is transmitted through a fluid coupling.

A further object is to provide an improved arrangement of drive connections for transmitting variable slip torque from the driving to the driven elements.

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 fragmentary vertical sectional view fore and aft of a typewriter embodying the invention and showing the relationship between a carriage and fluid drive coupling, and case shifting mechanism;

Figure 2 is a fragmentary vertical sectional view fore and aft of the machine showing type bar

actuating mechanism and carriage drive escapement mechanism;

Figure 3 is a fragmentary detail elevation on an enlarged scale showing a safety lock device;

Figure 4 is a fragmentary horizontal section on the line 4—4 of Figure 2;

Figure 5 is a vertical section taken from end to end of the typewriter shown in Figure 1 with some parts broken away, others omitted, and others shown in elevation;

Figure 6 is a fragmentary horizontal section with some parts being shown in elevation and others being omitted;

Figure 7 is a detail vertical section on the line 7—7 of Figure 6 showing a pawl and ratchet one way drive construction, drawn on an enlarged scale;

Figure 8 is a detail view in elevation showing a cam roller detent mechanism as viewed when looking in the direction of the arrow 8 in Figure 6;

Figure 9 is a fragmentary view partly in elevation and partly in vertical section, fore and aft of the machine, showing the case shift mechanism with a shiftable type bar segment in lower case position;

Figure 10 is a fragmentary vertical sectional view taken end-to-end of the machine and showing parts of the case shifting mechanism in lower case position;

Figure 11 is a fragmentary horizontal sectional view substantially on the irregular lines 11—11 of Figure 9 and showing the parts in the same positions as are shown in Figure 9; and

Figure 12 is a perspective view of a rockable latch member forming part of the case shifting mechanism, and its pivotal mounting element.

Introduction

The invention is capable of being embodied in typewriting machines of various kinds. For the purposes of illustration it is shown in connection with a typewriter the general construction and arrangement of many of the parts of which conform to the well known Royal Standard typewriter construction.

The typewriter illustrated comprises a main frame A mounted on which is a bottom rail 1 cooperable with a top rail 2 and interposed balls 3 for supporting a carriage B for letter spacing and return movements. A cylindrical platen member C is mounted on the carriage for travel therewith and for rotation thereon for line spacing purposes in the usual manner.

When the machine is conditioned for operation,

the carriage B is urged to move in the letter spacing direction under the control of an escapement mechanism unit generally designated D. The escapement mechanism comprises a fixed frame 6 which pivotally mounts a rocker 7 carrying a fixed dog 8 and a pivoted dog 9 cooperating in the usual manner with an escapement wheel 10. The wheel 10 is connected through a pawl 10^a to a pinion 11 normally in mesh with an escapement rack 12 mounted on the carriage. A universal frame 13 includes arms 14 pivoted at 15-15 on a frame mounted bracket 16. The universal frame is urged rearwardly by a spring 17 and includes a universal bar 18 adapted to be pulled forwardly upon the depression of one of the usual key levers or the space bar. Adjustably mounted on the frame 13 is a pressure plate 19 adapted to push against a roller 20 journaled at the lower end of a spring arm 21 carried by the rocker 7. When the frame 13 is rocked clockwise as viewed in Figure 2, the plate 19 pushes the roller 20 so as to rock the rocker 7 and operate the escapement mechanism D to effect a single letter spacing movement of the carriage in the usual manner. The usual space bar (not shown) having the arms 21^b is connected by a link 21^c to the universal frame 13.

The escapement rack 12 is mounted on a bail 22 which is pivoted as at 23 on the carriage end plates 24 and 25. Springs 26 respectively interposed between the carriage end plates and rearwardly extending arms 27 integral with the bail 22 normally hold the rack 12 down in engagement with the escapement pinion 11. For permitting tabulating movements of the carriage B, the bail 22 and the rack 12 are rocked clockwise as viewed in Figure 1 by a tabulating rack lift lever pivoted on the main frame and being formed with an ear 30 engageable with the bail 22 in the usual manner. The carriage is equipped with a tabular stop frame 31 mounting a plurality of key-settable stops (not shown). Mechanism (not shown) cooperable with the stop fingers on the frame 31 may, for example, be of the kind illustrated in the patent to Lewis C. Myers, No. 2,209,279, granted July 23, 1940.

The travel of the carriage in letter spacing and return directions is limited respectively by margin stops mounted on a margin stop bar 38 and being cooperable with a center stop 39. The right hand margin stop is shown at 36 in Figure 2. When the carriage approaches the end of its travel to the left in the letter spacing direction, the margin stop 36 operates a line lock lever 40 so that when the carriage is brought to rest by the center stop 39 the key levers cannot be operated. The line lock lever 40 is pivoted as at 41 on the center stop 39 and is formed with a downwardly extending arm 42, the lower end of which is connected by a link 43 to one arm 44 of a lever 45 pivoted as at 46 on frame brackets 47. A spring 48 interposed between the lever arm 44 and a frame mounted ear 49 urges the lever 45 and line lock lever 40 to non-line locking position, movement of the parts under the urge of the spring 48 being limited by engagement of a stop projection 50 on the lever 45 with the frame A. Another arm 44^a of the lever 45 is connected by a link 51 to a key lever blocking device, which in the form shown comprises a line lock plate 52 pivoted as at 53.

The usual case shift member, in the form shown a type bar segment E, is mounted for vertical shifting on the frame A and is equipped with a pivot wire 54 which mounts the usual

complement of type bar members, one of which is shown at 55. Each type member 55 is formed with a short arm 56 connected by a link 57 to an intermediate lever 58 pivoted as at 59 on the key lever bracket 60 carried by the frame A. The bracket 60 also mounts the key levers 61 which are pivoted on a fulcrum shaft 62 and are urged upwardly against a stop 63 by returning springs 64. Each key device 61 is connected by a link 65 to a front lever 66 pivoted as at 67 on the frame A. The type bars 55 normally and when in inactive position are supported at their free ends by a head rest 68.

In the conventional Royal Standard construction, as for example the construction shown in the patent to Henry J. Hart, No. 2,202,451, granted May 28, 1940, each of the front levers 66 is connected by a link to an associated intermediate lever 58 so that upon depression of a key lever, manually applied force is transmitted to the type bar for moving it to printing position. The invention claimed herein may be embodied either in typewriters in which manually applied force is relied upon for actuating the type bars, or in typewriters in which depression of a key lever controls the action of power means which applies the actual force for moving the type bars to printing position. In the illustrative embodiment depression of a key lever is utilized to disable a restraining device so as to permit power operable means to apply the effort for moving the associated type bar.

It will be understood that a key lever 61, the type bar 55 and associated parts shown in the drawings are representative of each of the plurality of type bar actions and associated key mechanism although only one complete type bar action is shown. The description of one complete type bar action is intended to serve as a description of the other type bar actions.

The similarity of the construction thus far described to the construction of the known Royal Standard typewriting machine will be apparent to those familiar with the art. Some other parts to be referred to hereinafter also will be recognized as being of known construction.

General description

In accordance with the invention claimed herein, power operated mechanism controlled by manually operable keys supplies the effort for the performance of the case shifting operation. A prime mover F, preferably an electric driving motor, transmits cushioned power through a fluid coupling slip or impositive drive device G for normally urging the carriage B in the letter spacing direction under the control of the escapement mechanism D.

Each type bar action is loaded by power means comprising a spring 79 which urges the associated type bar to move to printing position but which normally is prevented from acting by restraining mechanism H. Means are provided for individually releasing the restraining mechanism H associated with each key lever and type bar in response to operation of that key lever and movement of the carriage in the letter spacing direction.

Returning of the carriage B to line starting position is effected by transmitting drive from the motor F through reversing gearing generally designated I controlled by mechanism not shown herein but which is fully disclosed in the co-pending parent application Serial Number 493,450 and disclosed and claimed in divisional ap-

plication Serial Number 525,058, filed March 4, 1944.

Back spacing of the carriage through distances corresponding to a predetermined small number of letter spacing increments is effected by driving the carriage through the reversing gearing I under control of a separate back spacing escapement mechanism unit J disclosed in the parent application Serial Number 493,450 and disclosed and claimed in the aforementioned divisional application Serial Number 525,058, filed March 4, 1944.

Normally the type bar segment E is held in its upper position by mechanism generally designated K which is adapted to be released in response to depression of a shift key lever 82 for permitting the segment to be moved downwardly by gravity. The segment E is restored to its upper position by lifting mechanism generally designated L operated from the motor F under control of a shift release or reset key lever 83.

The platen C is adapted to be turned for line spacing by spring powered mechanism M also disclosed in parent application Serial Number 493,450 and disclosed and claimed in the aforementioned divisional application Serial Number 525,058, filed March 4, 1944.

Carriage driving mechanism

The motor F is equipped with a shaft 84 journaled as at 85—85 in the housing 86 of the reversing gear I. The shaft 84 turns in the direction of the arrow 87 and, by means of a worm 122 and worm wheel 124, transmits drive through the reversing gear I to a chain gear 88 which is driven in the direction of the arrow 89 for effecting carriage letter spacing travel and in the direction of the arrow 90 for returning or back spacing the carriage.

The chain gear 88 drives a chain 91 which in turn drives a chain gear 92 fast on a shaft 93 journaled at one end as at 94 in a frame bracket 95. Adjacent its other end the shaft is connected at 96 to the propeller element 97 of the kinetic type fluid coupling G which may be of the kind disclosed in the patent to John J. Kittel No. 2,279,141, granted April 7, 1942. The coupling runner element 98 houses the propeller 97 and the fluid 99, and is formed with hubs 100 and 101 journaled respectively in bearings 102 and 103 carried by the bracket 95. The end of the shaft 93 adjacent the coupling G is journaled by bearings 104 interposed between the shaft 93 and the hubs 100 and 101. A bellows seal 105 prevents escape of fluid past the hub 101. A gear 106 secured as at 107 to the runner hub 100 meshes with a rack 108 mounted on the carriage end plates by brackets 109 and 110.

In operation, when the machine is conditioned for the typing of a line, the motor F drives the coupling propeller 97 through the reversing gearing I in a direction tending to transmit drive through the fluid 99 to rotate the runner 98 and gear 106 and move the rack 108 and carriage B in the letter spacing direction. The carriage can be held at rest by the escapement mechanism D because of the impositive drive characteristics of the fluid coupling G. Whenever the escapement mechanism is operated so as to release the carriage for letter spacing travel, the fluid-transmitted effort becomes effective for advancing the carriage. When the carriage is brought to rest by the escapement mechanism, the cushioning effect provided by the fluid coupling G prevents the occurrence of any undesirable shock or strain.

During letter spacing operation the chain gear 88 is driven in the direction of the arrow 89.

For returning or back spacing the carriage, the gearing I is set to cause the chain gear 88 to rotate in the direction of the arrow 90. This will drive the propeller 97 of the coupling G in the opposite direction, thereby reversing the direction of rotation of the gear 106 and driving the rack 108 and carriage in the reverse or return direction.

Typing mechanism

The mechanism for operating and for controlling the operation of the type bars 55 is claimed in the parent application Serial Number 493,450 and is similar in some respects to mechanism disclosed in the co-pending application of John J. Kittel, Serial Number 493,449, filed July 3, 1943. Depressing of a key lever 61 is not made effective for applying manually exerted force for moving the type bar 55 on its printing stroke, but is utilized for releasing the restraint on a spring 79 connected between the intermediate lever 58 and an adjusting plate 157 pivoted as at 158 on the frame A. When released, the spring 79 contracts and rocks the lever 58 counterclockwise, thereby swinging the type bar 55 to printing position.

Depending from a curved slot 159 in the lever 58 is a link 160 pivoted at its lower end to a cam follower lever 161 in turn pivoted as at 162 on the frame A. The lever 161 is equipped with an anti-friction roller 163 which normally is held against upward movement by the restraining face 164 of a releasable bar lock keeper 165 pivoted as at 166. The roller 163 also is releasably restrained against upward movement by the crest of one of the eight lobes 167 on a resetting member comprising a cam 168 secured to a shaft 169 journaled on the typewriter frame A by suitable bearings on supporting plates 170 and 171. A detent roller 172 mounted on a lever 173 pivoted as at 174 on the supporting plate 170 is urged by a spring 175 anchored on a stud 176 into contact with a detent wheel 177 secured to the cam shaft 169 by a set screw 177^a for yieldably maintaining the cam 168 with the crest of a lobe 167 directly above the roller 163. Thus, both the bar lock keeper 165 and the cam 168 normally prevent rising of the roller 163 and therefore normally restrain the lever 58 from being rocked by the spring 79. In order to discontinue the restraint of both the keeper 165 and the resetting member 168 and permit the spring 79 to contract and drive the type bar to printing position it is necessary to displace the restraining face 164 of the keeper 165 from above the roller 163 and also to rotate the cam 168 so as to allow the roller to move into the depression between two cam lobes 167.

The bar lock keeper 165 is adapted to be rocked upon depression of the associated key 61 for displacing the restraining face 164 from above the roller 163. For this purpose an arm 178 on the keeper 165 is connected by a link 178^a to the key operated lever 66. Thus, upon depression of the key 61, the link 65 will rock the lever 66 clockwise to pull on the link 178^a and rock the keeper 165 counterclockwise thereby moving the keeper face 164 away from the roller 163.

Thereafter, to enable the spring 79 to actuate the lever 58, link 57 and type bar 55, the cam 168 is rotated one-eighth of a revolution. While the depression between the lobe 167 last positioned above the roller 163 and the next adjacent lobe is presented above the roller the lever 161 is free to rock clockwise. Hence the spring 79 contracts and

rocks the intermediate lever 58 counterclockwise unrestrained by the link 160 and lever 161, and the link 57 is pulled forwardly to swing the type bar 55 to printing position, as shown in Figure 2.

The force of the type bar printing impact may be varied by turning an adjusting screw 179 carried by the adjusting plate 157 and having its end engaging a fixed part of the frame A. If the screw 179 is turned to rock the adjusting plate 157 clockwise as viewed in Figure 2, the springs 79 associated with the respective type bars will be subjected to additional tension so as to be capable of swinging the type bars 55 into printing position with more force. Adjustment of the tension of the springs 79 is accompanied by a variation in the force required to depress the key levers 61, thus requiring a heavier "touch" to effect operation of a type bar. This is because additional tensioning of the springs 79 causes the rollers 163 to be held against the keepers 165 with greater force, thereby requiring additional manually applied effort for moving the keepers 165 from engagement with the rollers 163.

For operating the escapement mechanism D in response to the depression of a key lever 61, a supplemental universal bar 180 is pivoted at 166 and is engaged by projections 181 formed respectively on the bar keepers 165. An arm 182 on the supplemental universal bar 180 is connected to the escapement frame 13 by a pull rod 183 having its rear end hooked at 184 to embrace the rod 18 on the universal frame 13. Thus, when a key lever 61 is depressed, the associated keeper 165 is swung counterclockwise to the position shown in Figure 2, thereby rocking the supplemental universal bar 180 counterclockwise and swinging the universal frame 13 clockwise to actuate the escapement mechanism. When the key lever is released, the springs 17 and 64 will contract to restore the parts to their positions.

The cam shaft 169 is rotated step-by-step in response to carriage letter spacing travel and moves through one-eighth of a revolution in response to each letter spacing increment of carriage travel. Connections between the carriage driving mechanism and the cam shaft 169 include a gear 184 secured to the front end of a shaft 185 and meshing with the carriage driving gear 106. A gear 186 secured to the rear end of the shaft 185 meshes with a gear 187 rotatable on a shaft 188 and meshing with a gear 189 fast on a shaft 190 journaled as at 191 and 192. A sleeve 193 freely rotatable on the shaft 190 is fast with a ratchet wheel 194 engageable by a pawl 195 carried on an arm 196 fast with the shaft 190. A spring 197 urges the pawl 195 into operative engagement with the ratchet wheel 194. A spiral gear 198 fast with the sleeve 193 meshes with a spiral gear 199 secured to the cam shaft 169. When the carriage moves in the letter spacing direction, the gears 106, 184, 186, 187, and 189 rotate the ratchet shaft 190 in the direction of the arrow 200 (Figure 7) and move the one way drive device 194-195 and sleeve 193 through one-eighth of a complete revolution for each single letter spacing movement of the carriage. Drive is transmitted from the sleeve 193 through the spiral gears 198 and 199 to rotate the cam shaft 169 also through one-eighth of a revolution for each letter spacing increment of the carriage movement.

Normally, each type bar actuating spring 79 is restrained by engagement of the associated roller 163 with a lobe 167 and with the associated keeper restraining face 164. When a key

lever 61 is depressed, the associated keeper 165 is swung to the position shown in Figure 2, thereby rocking the supplemental universal bar 180 and operating the escapement mechanism D in the manner previously described. When the carriage moves in response to operation of the escapement mechanism the cam shaft 169 is rotated as explained above. As the cam lobe 167 which was in contact with the roller 163 prior to operation of the key lever 61 moves from above the roller 163, a cam depression will be presented above the roller 163 and the roller will be enabled to rise so as to permit the spring 79 to move the type bar 55 to printing position, the retreating cam lobe piloting the type bar to typing position. The type bar will reach printing position when the cam shaft has moved through one-sixteenth of a revolution, the parts then being positioned as shown in Figure 2. During the next one-sixteenth of a revolution of the cam shaft 169, the next or following cam lobe 167 will engage the roller 163 so as to move the arm 161 downwardly, thereby restoring the type bar 55 to its position of rest, reloading the spring 79, and enabling the restraining face 164 of the keeper 165 to move over the roller 163. The parts then will have been returned to their normal positions and the escapement mechanism D will have arrested the carriage and the cam shaft 169.

As shown in Figure 2, the shape and size of the cam 168, the mounting of the type member 55, and the connections between the roller 163 and the type member 55 are so interrelated that the roller 163 is out of contact with the cam 168 when the type member 55 reaches typing position. Thus the cam 168 is effective for restraining or piloting the type member during part of the typing stroke but not during the last part of the stroke. Consequently the adjustment of the spring 79 can be effective for varying the force of the type impact.

In the event it is necessary for a service man to perform a type bar aligning operation, requiring the manual raising and holding of individual type bars in or near printing position, the cam shaft 169 is set to position depressions between cam lobes 167 of each cam 168 directly above the rollers 163 associated with the respective type bars 55. For setting the cam shaft 169 in this position, the set screw 177^a is loosened and the detent wheel 177 is slid to the left, as viewed in Figure 6, and is turned together with the cam shaft 169 until a pin 177^b on the detent wheel enters a hole 177^c in the supporting plate 170. The settable means 177^b-177^c will position the cams 168 with cam depressions immediately below the rollers 163 as shown in Figure 2, that is with the cams displaced angularly one-sixteenth of a revolution from the normal position. Any type bar 55 may then be manipulated by hand after releasing the associated bar lock keeper 165 by depressing the key lever 61.

Case shifting mechanism

The case shifting segment member E is biased to a lower position by its own weight but normally is held in its upper position for the typing of small letters by the releasable means K including two links 280 pivoted to the segment as at 281 and pivoted as at 282 to a shift frame generally designated 283. The shift frame 283 comprises arms 284 and 285 connected to a tie rod 286 and respectively being fitted with pintles

287 and 288 journaled in-frame bearings 289 and 290. The shift frame arm 284 is formed with a vertical extension 291 equipped with a cam follower roller 292 normally engaged by the cam end 293 of a secondary release latch or interponent 294 pivoted on the tie rod 166 and on a shouldered screw 295 (see Figures 10 and 11) extending through the mounting plate 171 and into the tie rod 166.

The interponent latch 294 comprises spaced arms 296 and 297 connected by a cross bar 298, and an extension 299 on the arm 297. A spring 300 interposed between the extension 299 and a post 301 on the mounting plate 171 urges the latch 294 to rock clockwise from the normal position shown in Figure 1. However the latch 294 normally is held in its Figure 1 position by engagement of a roller 302 on the arm 296 with a retainer 303 on a segment release latch or retainer device 304 which is pivoted on a headless screw 305 threaded at 306 in the frame A. A link 307 is pivoted as at 308 to the shift key 82 and is pivoted at 309 to the segment release latch 304. As shown clearly in Figure 12, the release latch 304 comprises spaced arms 310 and 311 connected by a cross bar 312, the retainer 303 extending upwardly from the arm 310.

In operation, when the shift lever 82 is depressed and rocked counterclockwise as viewed in Figure 1, the link 307 will be retracted to rock the segment release latch 304 clockwise to the position shown in Figure 9. With the retainer 303 in this displaced position, the roller 302 can move downwardly, thereby enabling the spring 300 to rock the secondary release latch 294 to the position shown in Figure 9. This will displace the cam end 293 from its holding position in contact with the roller 292 so as to permit the shift frame 283 to rock counterclockwise from its Figure 1 position to its Figure 9 position. The segment E will then descend by gravity, its weight being partially counter-balanced by a spring 313 connected between the shift frame vertical extension 291 and an adjustable anchor 314 pivoted as at 315 on a bracket 316. When the shift lever 82 is released it will be returned to its normal position by a spring 82^a.

The shifting of the segment E is cushioned by shock absorbers provided at each end of the segment and each comprising a pin 317 having threaded connection with the segment as at 318 and passing through a frame lug 319. Cushioning springs 320 are mounted on each pin 317 both above and below the associated lug 319, the positions of the springs being variable by adjusting nuts 321.

Means actuated by power supplied from the motor F through the fluid coupling G are provided for returning the segment to its upper position. A resetting cam 322 is keyed as at 323 to the cam shaft 169 so as to rotate therewith and to be slidable axially thereon. A spring 324 interposed between the mounting plate 171 and the resetting cam 322 yieldably urges the cam to a normal position shown in Figure 11 wherein the cam is displaced axially out of the plane of a cam follower roller 325 mounted on the arm 297 on the secondary release latch 294. During normal typing operation the cam 322 rotates with the cam shaft 169 but has no effect upon the roller 325.

For shifting the cam 322 into position for co-operation with the roller 325, a lever 326 pivoted as at 327 on a bracket 328 is equipped with a pin 329 extending into a groove 330 in the hub of

the cam 322. The lever 326 is connected by a link 331 to the shift release lever 83.

In operation, when it is desired that the segment E be returned to its upper position, the shift reset lever 83 is rocked counterclockwise as viewed in Figure 9, causing it to pull on the link 331 and to rock the lever 326 clockwise as viewed in Figure 11. The pin 329 will then shift the cam 322 into the plane of the interponent roller 325. While the shift reset lever 83 is held depressed the operator strikes a key lever 61. This effects a letter spacing carriage step movement accompanied by a step rotation of the shaft 169 and the resetting cam 322. When the cam shaft and cam 322 are rotated a lobe on the cam will raise the roller 325, thereby rocking the interponent 294 counterclockwise from its Figure 9 position to its Figure 1 position. The cam end 293 will force the roller 292 to the right as viewed in Figure 9 to rock the shift frame 283 back to its normal position as shown in Figure 1. The segment E will be returned to its upper or normal position just a little before the type bar reaches the printing point. The spring 82^a will then return the shift key 82 and the segment release latch 304 to their normal positions with the retainer 303 again disposed under the roller 302 on the secondary latch 294, the parts then all being set for the typing of small letters with the segment E supported in its upper position. The cam-urging spring 324 acts through the cam 322, lever 326, and link 331 to return the shift release lever 83 to its normal position.

Safety lock mechanism

Means claimed in the copending divisional application Serial Number 525,060, filed March 4, 1944, are provided for preventing operative depressing of more than one key lever 61 at the same time, thereby making it impossible for two or more type bars to collide and/or jam. The usual Royal line lock plate 52 is modified by having formed integrally therewith an extension blade 332 which serves as an operating part adapted to be engaged by the heel 333 of an abutment 334 on any key lever 61 when it is depressed. The device comprising the parts 52 and 332 is generally of V shape with the leg 332 normally extending diagonally across the paths of the abutment heels 333. When the key lever is depressed to the position shown in full lines in Figures 2 and 3, the abutment heel 333 engages the operating part 332 and rocks the blocking part 52 rearwardly from its normal forwardly offset position to the position shown in full lines in Figures 2 and 3. The line lock plate 52 will then be disposed directly under the toes 335 of the aligned key lever abutments 334 so as to prevent operative downward movement of the other key levers. This operation of the safety lock does not disturb the line lock lever 40 because the link 51 interposed between the line lock plate 52 and the line lock lever 40 has its front end connected to the line lock plate 52 by a one way drive connection including a part 336 of the link 51 and a slot 337 in the line lock plate. Thus rearward movement of the link 51 in response to operation of the line lock lever 40 will move the line lock plate 52 to its locking position but rearward movement of the line locking plate caused by depression of a key lever 61 will not move the link 51.

The safety lock device prevents the operation of more than one key lever when the motor F is running and also prevents the depressing of more than one key lever when the motor is shut

off. Thus damaging of the type bar mechanism is avoided.

Ribbon spool drive

The usual ribbon spool driving shaft 338 is driven from the motor F through the fluid coupling G and gearing I. A pinion 339 meshes with the gear 106 and transmits drive in one direction only through an enclosed ratchet device 340 to a shaft 341 which is connected through a universal coupling 342 to the ribbon spool driving shaft 338.

Summary

It is apparent that mechanism embodying the invention disclosed herein provides for the smooth performance with minimum manual effort of usual typewriter functions or operations previously requiring the exertion of substantial manual effort in the operation of most standard or conventional typewriters. The mechanism for supplying the power and controlling its application may be installed conveniently in typewriters of basically standard and approved design, and is adapted to be interconnected with standard typewriter parts the design and arrangement of many of which need not be changed at all.

The fluid drive connection between the prime mover F and the type bar spring resetting mechanism, the traveling carriage, and the case shifting mechanism provides for both rapid and smooth operation free from undesirable shocks and noise. The flexible, cushioning drive transmitting characteristics of the fluid coupling are especially advantageous in a construction in which the power for performing several typewriting functions is supplied by a single motor or prime mover. There always is available an adequate source of smooth, cushioned power for the performance of any one or the simultaneous performance of more than one operation.

The mechanism described with reference to the drawings embodies the invention in the form now preferred, but it is evident that changes may be made without departing from the invention as defined in the claims.

I claim:

1. In a typewriter or like machine, a case shift member movable selectively to two positions and being biased toward one of said positions; a cam follower connected to said member; a cam engageable with said follower and normally positioned to maintain said member in the other of said positions against said bias; a shift key; means responsive to operation of said shift key for moving said cam to enable said follower to move under the urge of said bias and to thus permit movement of said shift member to said one of said positions; a shift reset key; and power driven means responsive to operation of said shift reset key for actuating said cam to move said follower against said bias and to thereby move said shift member back to said other of said positions.

2. In a typewriter or like machine, a case shift member movable selectively to two positions and being biased toward one of said positions; a cam follower connected to said member; a cam engageable with said follower and normally positioned to maintain said member in the other of said positions against said bias; a retainer device for releasably holding said cam in its normal position; a shift key connected to said retainer device and being operable for moving said retainer device to release said cam and to thus permit movement of said shift member under the

urge of said bias to said one of said positions; a shift reset key; and power driven means responsive to operation of said shift reset key for actuating said cam to move said follower against said bias and to thereby move said shift member back to said other of said positions.

3. In a typewriter or like machine, a case shift member movable selectively to two positions and being biased toward one of said positions; a first rockable member connected to said case shift member; a cam follower on said first rockable member; a second rockable member; a cam on said second rockable member adapted when in normal position to engage said follower for holding said shift member in the other of said positions; a roller on said second rockable member; a third rockable member having a retainer face normally engaging said roller for holding said second rockable member in its normal position; and key controlled means for rocking said third rockable member to permit movement of said roller and said second and first rockable members and consequent movement of said shift member to said one of said positions.

4. In a typewriter or like machine, a case shift member movable selectively to two positions and being biased toward one of said positions; a first rockable member connected to said case shift member; a cam follower on said first rockable member; a second rockable member; a cam on said second rockable member adapted when in normal position to engage said follower for holding said shift member in the other of said positions; a roller on said second rockable member; a third rockable member having a retainer face normally engaging said roller for holding said second rockable member in its normal position; key controlled means for rocking said third rockable member to permit movement of said roller and said second and first rockable members and consequent movement of said shift member to said one of said positions; and key controlled power driven means for moving said second rockable member back to normal position to thereby cause said cam to drive said follower and said first rockable member for moving said shift member back to said other of said positions.

5. In a typewriter or like machine; a case shift member movable selectively to two positions and being biased toward one of said positions; and mechanism for moving said member from said one of said positions to the other of said positions comprising an interponent operatively connected to said shift member, a follower on said interponent; a shaft; a cam constrained to rotate with said shaft but being movable axially thereon into and out of position for cooperation with said follower for actuating said interponent; means for rotating said shaft; and key controlled means for shifting said cam into and out of position for cooperation with said follower.

6. In a typewriter or like machine; a case shift member movable selectively to two positions and being biased toward one of said positions; and mechanism for moving said member from said one of said positions to the other of said positions comprising an interponent operatively connected to said shift member, a follower on said interponent; a shaft; a cam constrained to rotate with said shaft but being movable axially thereon into and out of position for cooperation with said follower for actuating said interponent; a spring yieldably holding said cam out of its position of cooperation with said follower; key actuated mechanism for shifting said cam into

said position; a motor; and connections including an impositive drive fluid coupling said motor and said shaft.

7. In a typewriter or like machine, a case shift member movable selectively to two positions and being biased toward one of said positions; a first rockable member connected to said case shift member; a cam follower on said first rockable member; a second rockable member; a cam on said second rockable member adapted when in normal position to engage said follower for holding said shift member in the other of said positions; a roller on said second rockable member; a third rockable member having a retainer face normally engaging said roller for holding said second rockable member in its normal position; key controlled means for rocking said third rockable member to permit movement of said roller and said second and first rockable members and consequent movement of said shift member to said one of said positions; a motor driven shaft; a cam follower on said second rockable member; a resetting cam constrained to rotate with said shaft but being movable thereon into and out of position for cooperation with the cam follower on said second rockable member for actuating the latter to move said shift member to said other of its positions; and key controlled means for shifting said resetting cam into and out of its position for cooperation with said cam follower.

8. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; means for retracting said printing members from printing position; a case shift member movable selectively to two positions; releasable means for holding said case shift member in one of said positions; shift control means for releasing said releasable means to effect movement of said case shift member to the other of said positions; returning means for moving said case shift member from said other of said positions to said one of said positions; a motor; an impositive drive fluid coupling between said motor and said returning means, said power means being effective for moving said printing members to printing position independently of transmission of drive by said fluid coupling shift reset control means for effecting transmission of drive from said motor through said fluid coupling to actuate the returning means and to thus move said case shift member to said one of said positions; and means for moving said releasable means to again hold said case shift member in said one of said positions.

9. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; means for retracting said printing members from printing position; a case shift member movable selectively to two positions and being biased toward one of said positions; latch means for holding said case shift member in the other of said positions; shift key-controlled means for releasing said latch means to enable said case shift member to be moved by said bias to said one of said positions; returning means for moving said case shift member from said one of said positions to said other of said positions; a motor; an impositive drive coupling between said motor and said returning means, said power means being effective for moving said printing members to printing position independently of transmission of drive by said impositive drive coupling shift reset key-controlled means for ef-

fecting transmission of drive from said motor through said coupling to actuate said returning means and to thus move said case shift member to said other of said positions; and means for then moving said latch means to again hold said case shift member in said other of said positions.

10. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; and means for retracting said printing members from printing position; a case shift member movable selectively to two positions and being biased toward one of said positions; latch means for holding said case shift member in the other of said positions; shift key-controlled means for releasing said latch means to enable said case shift member to be moved by said bias to said one of said positions; returning means for moving said case shift member from said one of said positions to said other of said positions; a motor; a kinetic type fluid coupling between said motor and said returning means, said power means being effective for moving said printing members to printing position independently of transmission of drive by said impositive drive coupling shift reset key-controlled means for effecting transmission of drive from said motor through said coupling to actuate said returning means and to thus move said case shift member to said other of said positions; and means for then moving said latch means to again hold said case shift member in said other of said positions.

11. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; means for retracting said printing members from printing position; a case shift member movable selectively to two positions and being biased toward one of said positions; latch means for holding said case shift member in the other of said positions; shift key-controlled means for releasing said latch means to enable said case shift member to be moved by said bias to said one of said positions; returning means for moving said case shift member from said one of said positions to said other of said positions; a motor; an impositive drive coupling between said motor and said returning means; key actuated means for controlling said returning means, said power means being effective for moving said printing members to printing position independently of transmission of drive by said impositive drive coupling shift reset key-controlled means for effecting transmission of drive from said motor through said coupling to actuate said returning means and to thus move said case shift member to said other of said positions; and means for then moving said latch means to again hold said case shift member in said other of said positions.

12. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; means for retracting said printing members from printing position; a case shift member movable selectively to two positions and being biased toward one of said positions; a cam follower connected to said case shift member; a cam engageable with said follower and normally positioned to maintain said case shift member in the other of said positions; a shift key; means responsive to operation of said shift key for effecting movement of said cam to enable said follower to move and to thus permit movement of said case shift member to said one of said positions; a shift reset key; a motor; and means con-

trolled by said shift reset key and including an impositive drive fluid coupling for transmitting drive from said motor to said cam for moving said case shift member back to said other of said positions, said power means being effective for moving said printing members to printing position independently of transmission of drive by said fluid coupling.

13. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; means for retracting said printing members from printing position; a case shift member movable selectively to two positions and being biased toward one of said positions; and mechanism for moving said case shift member from said one of said positions to the other of said positions comprising an interponent operatively connected to said case shift member, a follower on said interponent; a cam cooperable with said follower for actuating said interponent to move said case shift member; a motor; driving connections including an impositive drive fluid coupling between said motor and said cam; and key-controlled means for effecting driving of said cam from said motor through said coupling to

thereby move said case shift member to said other of said positions, said power means being effective for moving said printing members to printing position independently of transmission of drive by said fluid coupling.

14. In a typewriter or like machine, a set of printing members; key-controlled power means for moving said printing members to printing position; means for retracting said printing members from printing position; a case shift member movable selectively to two positions; a spring partially counterbalancing the weight of said case shift member but not sufficiently to prevent said case shift member from moving by gravity to its lower position; lifting means including a motor, and an impositive drive fluid coupling for transmitting drive from said motor to said case shift member for moving said case shift member to its upper position; releasable means for holding said case shift member in its upper position; and key means for controlling said lifting means and said releasable means, said power means being effective for moving said printing members to printing position independently of transmission of drive by said fluid coupling.

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