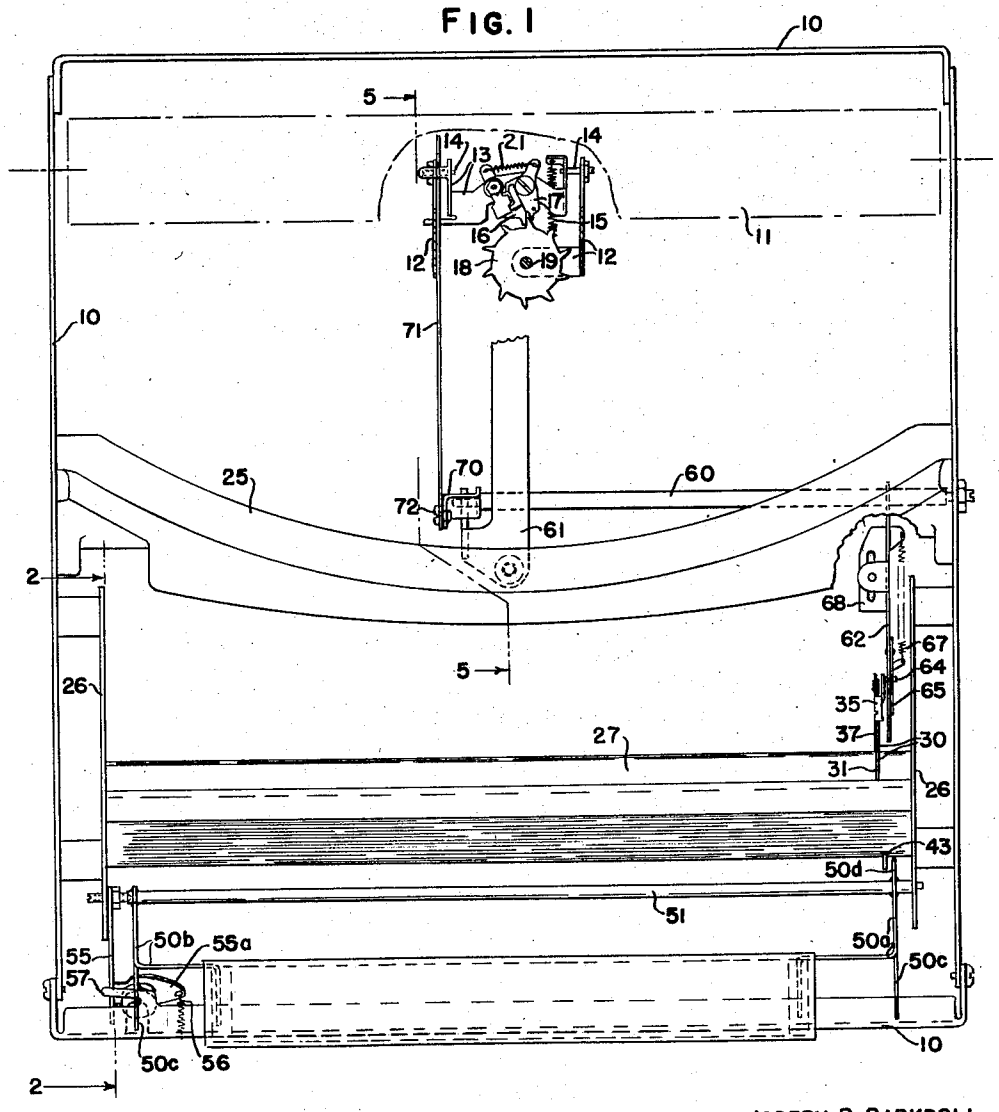
July 28, 1959 J. P. BARKDOLL 2,896,767

SPACING MECHANISM FOR POWER OPERATED TYPEWRITER

Filed April 8, 1958 4 Sheets-Sheet 1

FIG. 1



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SPACING MECHANISM FOR POWER OPERATED TYPEWRITER

Filed April 8, 1958 4 Sheets-Sheet 2

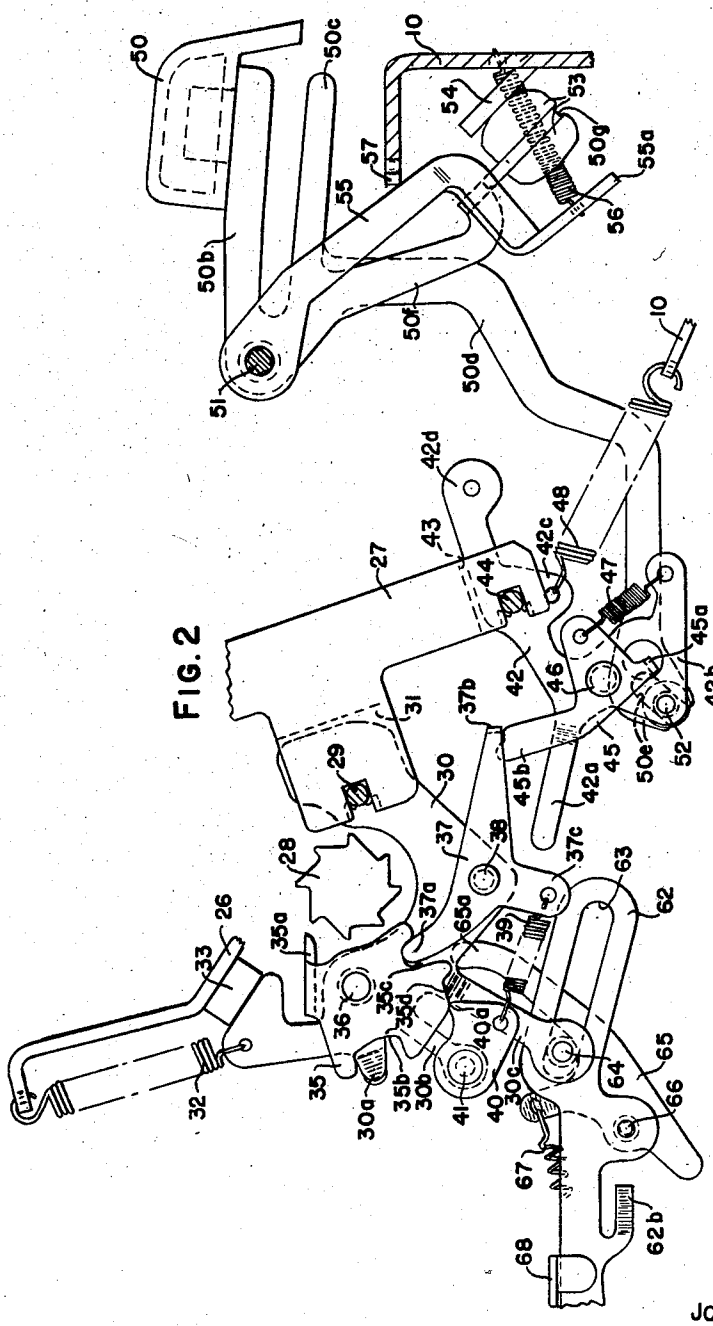


FIG. 2

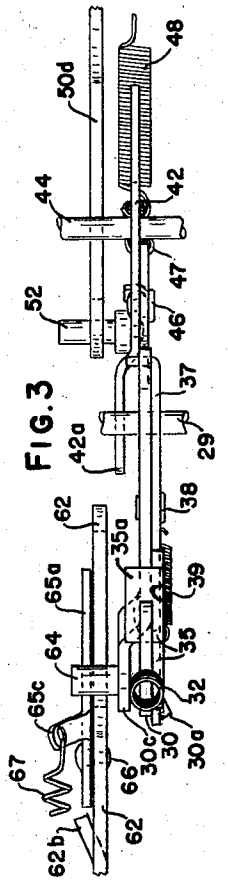


FIG. 3

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SPACING MECHANISM FOR POWER OPERATED TYPEWRITER

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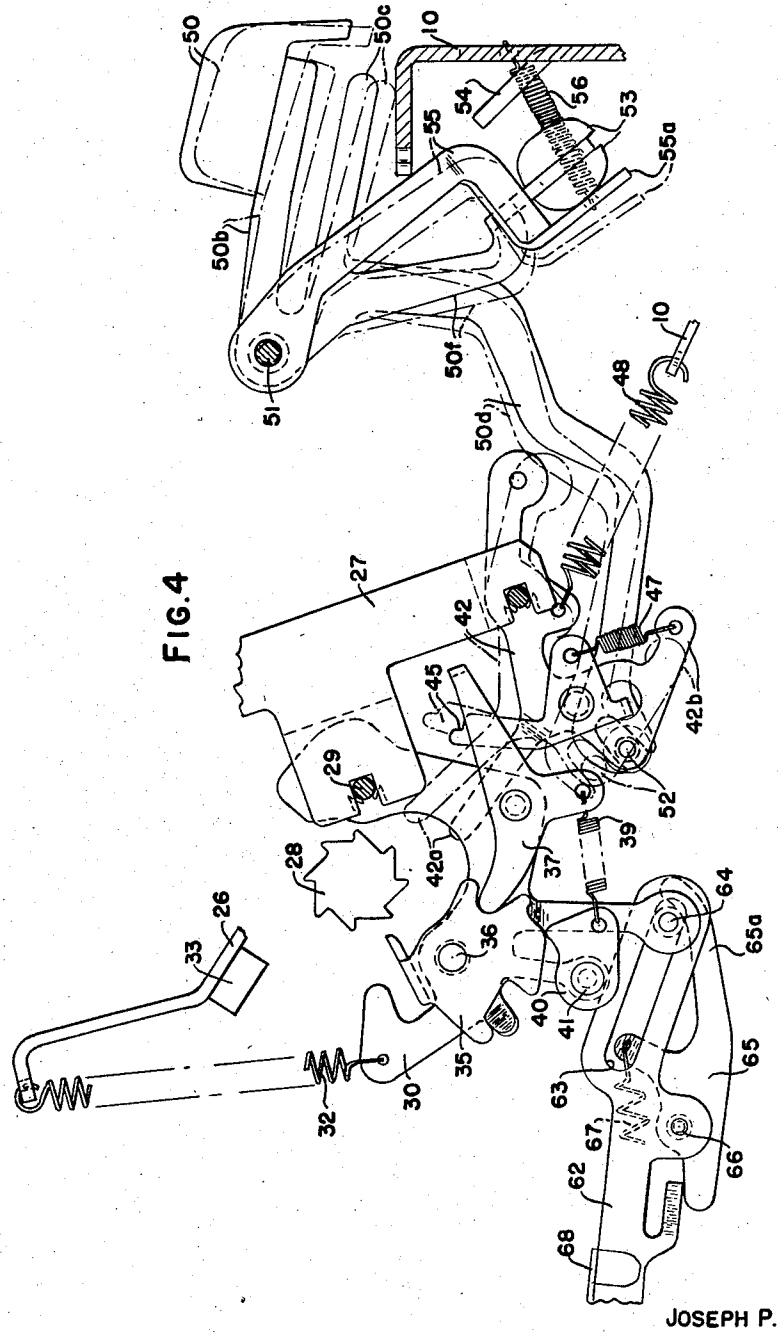


FIG. 4

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SPACING MECHANISM FOR POWER OPERATED TYPEWRITER

Filed April 8, 1958 4 Sheets-Sheet 4

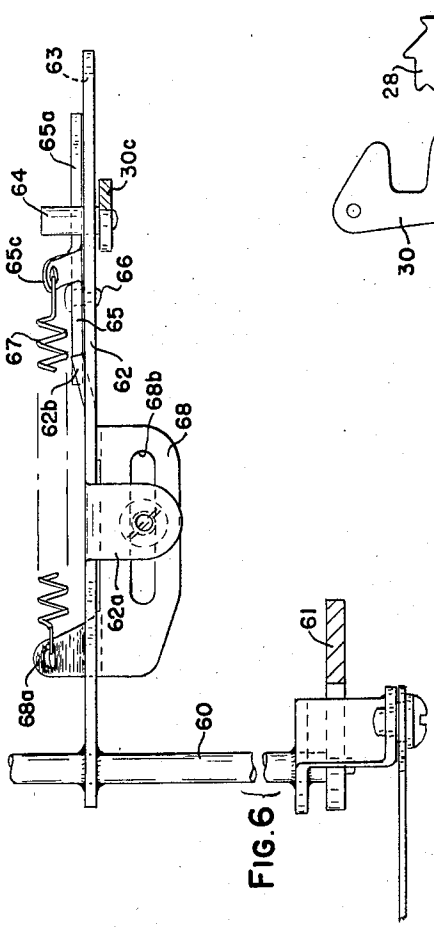


FIG. 6

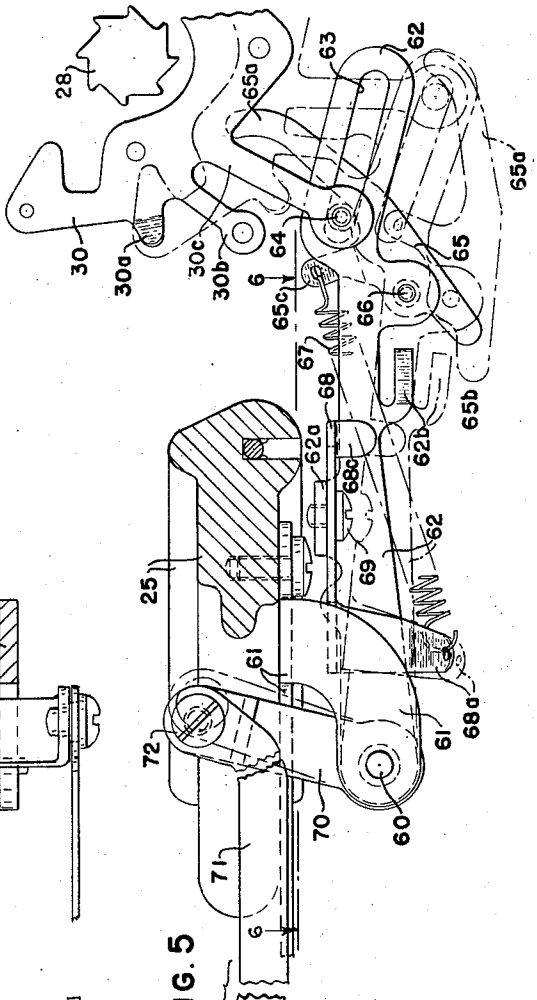
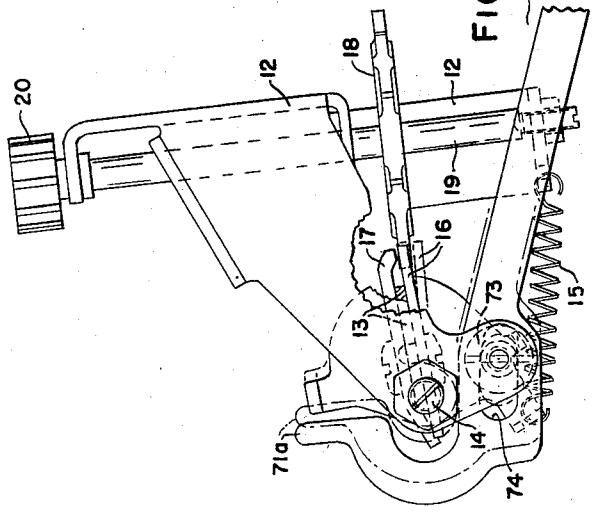


FIG. 5



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United States Patent Office 2,896,767
Patented July 28, 1959

2,896,767

SPACING MECHANISM FOR POWER OPERATED TYPEWRITER

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Application April 8, 1958, Serial No. 727,090

6 Claims. (Cl. 197—82)

The invention relates to improvements in a spacing mechanism for power operated typewriters.

Objects of the invention are to provide improved means for effecting letter spacing movement of the carriage of a power operated typewriter under control of a space bar located at the keyboard at high typing speeds and with minimum wear and noise; to provide improved means for effecting such letter spacing movement without shock and skipping; to provide for optional repeat or non-repeat action of letter spacing mechanism under the control of a single space bar; to provide for such repeat action having steady and even rate of repeat; and to provide such improved means characterized by simplicity, compactness, low cost of manufacture and ease of assembly and servicing, requiring little power for effective operation and permitting incorporation in a very small and low electric typewriter of light weight which is easily portable.

Other objects and advantages of the invention will appear from the following detailed description of the invention as shown in its preferred embodiment in the accompanying drawings.

In the drawings:

Figure 1 is a fragmentary top plan view of the improved machine showing certain parts, hereinafter described, of the letter spacing mechanism of the present invention;

Figure 2 is an enlarged fragmentary sectional view of a portion of the machine on the line 2—2 of Figure 1, the parts being in normal rest position;

Figure 3 is a top plan view of certain of the parts shown in Figure 2;

Figure 4 is a view similar to Figure 2, the parts being in operated position;

Figure 5 is an enlarged fragmentary sectional view of a portion of the machine on the line 5—5 of Figure 1, the parts being in rest position, the operated position thereof being indicated in broken lines; and

Figure 6 is a fragmentary sectional view on the line 6—6 of Figure 5.

The conventional parts of the known typewriter shown are substantially similar to those shown and described in detail in United States Patent 1,981,982, granted November 27, 1935, to H. A. Avery, and, therefore, need only be briefly described. These parts include a main frame **10** which is rectangular in plan, having a pair of side plates, front and rear end plates, and an intermediate cross plate which supports the usual carriage, not shown, which, in turn, bears the platen **11**.

An escapement support bracket **12** is secured to a suitable cross member of the frame **10** and an escapement mechanism, more particularly described in my United States Patent 2,649,179, granted August 18, 1953, is supported therein. The rocker **13** of the escapement mechanism is supported on the pivots **14** and is adapted to rock from a rest position shown in full lines in Figure 5 to an operated position indicated therein in broken lines, being biased to rest position by the return spring **15**. Rocker **13** carries the usual holding dog **16** and stepping dog **17** for effecting the step by step advancement of the toothed ratchet wheel **18** which is fixed to the shaft **19**. It will be understood that shaft **19** is also provided with a pinion **20** in mesh with a rack, not shown, on the platen carriage, the carriage being spring biased in the usual manner for the movement of platen **11** from right to left in Figure 1. Dogs **16** and **17** are pivotally secured to the rocker **13**, provided with appropriate stops, and biased by spring **21** for the stepping operation of dog **17** and the carriage return movement of dog **16**.

The improved power typewriter, as more fully disclosed and shown in my co-pending application Serial No. 686,925, filed September 30, 1957, is also provided with a curved, horizontally disposed, sub-lever segment **25** secured to the side plates of the main frame **10**, and with a sub-frame comprising, in part, side plates **26** and the straight, horizontal fulcrum bar **27**. The sub-frame side plates **26** are spaced from and secured to the side plates of the main frame **10**.

The power producing parts (Figures 2, 3 and 4) of the improved spacing mechanism, now to be described, are, with the exception of the tongue **30***c*, hereinafter described, identical with those shown and described in the aforesaid application Serial No. 686,925. A horizontally disposed, toothed snatch roll **28** is journaled in the side plates **26** and is continuously rotated, by means not shown, while the machine is in operation. Adjacent roll **28** and supported on the pivot wire **29**, an actuator lever **30** lies in the guide slot **31** of the fulcrum bar **27**, guided thereby for limited vertical oscillatory motion. A return spring **32**, connecting the upward and rearward end of the generally curved lever **30** with a transversely extending portion of the sub-frame connected to the side plates **26**, normally holds the lever upward against a sound deadening stop **33**.

A pawl **35** is secured to the actuator lever **30** by a shouldered rivet **36** for limited oscillatory movement with respect to the lever, and is provided with a horizontally bent portion **35***a* forming a tooth for engagement with the power roll **28**. A tongue **30***a* transversely bent from the lever **30** is adapted to engage either end of a notch **35***b* formed in the rearward edge of the pawl **35** for limiting the movement of the pawl on the actuator lever **30** between a rest position, as shown, and a roll engaging position as the tooth **35***a* engages with the teeth of the power roll **28**.

A pawl operating lever **37** is also carried on the actuating lever **30**, being pivotally secured thereto by the shouldered rivet **38**. The rearward arm **37***a* of the lever is loosely engaged in a notch **35***c* formed in the lower edge of the pawl **35**, and the forward arm carries a transversely bent projection **37***b*. A third, pendant arm **37***c* of the lever **37**, has secured thereto a spring **39**, the other end of which is secured to a cam member **40** also carried on the actuating lever.

The cam member **40** is secured to a depending tongue **30***b* formed on the lever **30** by means of a shouldered rivet **41** so as to be rotatable thereon within the limits imposed by the spring **39**. A cam nose **40***a* on the cam **40** is normally engaged with the lower edge of pawl **35** just rearward of a cam portion **35***d* on the lower edge of the pawl. The cam portion **35***d* is so disposed that, when the cam nose **40***a* is in contact therewith, the pawl **35** is cammed to its roll-engaging limit by the action of spring **39**.

The pawl **35**, lever **37** and cam **40** are so arranged on the lever **30** that the action of spring **39** is to normally bias the pawl **35** to its rest position by the interengagement of the arm **37***a* in the slot **35***c*. When lever **37** is turned counterclockwise as viewed in Figure 2,

the arm 37*a* engages the other side of the notch 35*c* and pawl 35 is rotated clockwise. As the pawl is turned, the cam nose 40*a* engages the cam portion 35*d* of the pawl 35 which is thereupon snapped to its roll engaging limit. Since roll 28 is continuously rotating, the actuating lever 30 is thereupon moved from its normal rest position shown in Figure 2 to an actuated position shown in Figure 4. The pawl tooth 35*a* is rolled free of the roll 28 and the pawl 35 thereupon turned back to its rest position by the lever 37.

The actuator lever 30 of the present invention, like the actuator lever of the action described in my co-pending application Serial No. 686,926, filed September 30, 1957, for a case shift mechanism, is provided with a second depending tongue 30*c* for a purpose which shall become apparent.

As in the mechanisms of both above-mentioned co-pending applications, a pawl tripping lever 42 is provided, having a rearwardly projecting repeat stop arm 42*a*, a pendant trigger action portion 42*b*, and a pendant return spring attaching portion 42*c*. The tripping lever 42 is supported in a guide slot 43 of the fulcrum bar 27 by the pivot wire 44 and may have a forwardly projecting arm 42*d* for the sake of interchangeability in the actions of other instrumentalities of the typewriter.

A trigger 45 is secured to the rearward end of the tripping lever 42 by a suitable shouldered rivet 46 and a transversely turned tongue 45*a* projects through a hole in the portion 42*b* of the tripping lever to provide a rest position stop for the trigger. A spring 47 from the trigger 45 to the portion 42*b* of the lever biases the upper portion 45*b* of the trigger in rest position to normally underlie the transversely turned tongue 37*b* of the pawl operating lever 37.

A return spring 48 is provided for the tripping lever 42, extending from the portion 42*c* to a portion of the frame 10.

In the foregoing setting the present invention will now be described.

At the front of the machine a conventional space bar 50 is provided, having supporting arms 50*a* and 50*b* rigid therewith and at the right and left side of the machine, respectively. The supporting arms are secured to a rock shaft 51 which is journaled in the sub-frame side plates 26 and have forwardly projecting portions 50*c* which serve as ultimate down stops when they strike the front plate of the frame 10.

The right hand support arm 50*a* has a downwardly and rearwardly projecting arm 50*d*, best seen in Figure 2, extending to a slotted end 50*e* adjacent the portion 42*b* of the tripping lever 42. Engaged in this slot is a transversely projecting pin 52 secured in the tripping lever 42 so that depression of the space bar 50 elevates the portion of lever 42 on which the trigger 45 is carried and the return action of the spring 48 is transmitted to the space bar.

The left hand space bar support arm 50*b* is provided with a downwardly and forwardly extending arm 50*f* which carries a transversely turned flange 50*g* carrying a rubber bumper pad 53. An inwardly struck tongue 54 from the front plate of the frame 10 provides a stop encounterable by the bumper 53 for limiting the upward travel of the space bar 50.

At the left side of the machine a down stop lever 55 is pivotally secured to the side plate 26, preferably on the same pivot as space bar cross shaft 51. A transversely turned portion 55*a* of the lever 55 provides a platform against which the buffer 53 may strike and a spring 56 anchored in the front plate of the frame 10 holds the lever 55 in its uppermost position to provide a normally limiting down stop for space bar 50. A tongue 57 struck from the front plate of the machine provides a deformable stop for adjustably fixing the normal position of the lever 55, but abnormal pressure on the space bar 50 results in the stretching of spring 56

and lowering of the space bar until the portions 50*c* strike the front plate of frame 10.

Referring now to Figures 1 and 5, a conventional rock shaft 60 is provided which is journaled at one end in the side plate of the frame 10 and at the other end in a bracket 61 secured at the center of the machine to the cross member 25. A forwardly projecting operating arm 62 is secured to the shaft 60, having at its forward end a cam slot 63 formed therein longitudinally of the arm. A transversely projecting camming pin 64, secured to the arm 30*c* of the actuating lever 30, is engaged in the slot 63 for rocking the shaft 60 as the lever 30 moves from its rest position, shown in full lines in Figure 5, to actuated position, shown therein in broken lines.

A control lever 65 is pivotally secured to the rock shaft operating lever 62 rearwardly of, and below the cam slot 63 by a shouldered rivet 66. The control lever 65 has a forwardly projecting arm 65*a* for engaging the pin 64 and a rearwardly projecting arm 65*b* adapted to strike against an angularly bent tongue 62*b* on the lever 62 for limiting the clockwise movement of control lever 65 with respect to the operating arm 62 as viewed in Figure 5. The arm 65*a* is so disposed as to be substantially across the slot 63 when engaged with the pin 64 and when actuating lever 30 is in its rest position. When the actuating lever has reached its actuated position, pin 64 is substantially at the outer end of slot 63 and the arm 65*a*, in contact with pin 64, is disposed at a substantial angle to the slot 63.

An upwardly projecting arm 65*c* of the control lever has a spring 67 secured thereto for biasing the arm 65*a* at all times against the pin 64. The other end of spring 67 is secured to a downwardly bent ear 68*a* of an adjustably positioned spring anchoring bracket 68 which is secured by the screw 69 to a transversely bent ear 62*a* on the operating arm 62. Screw 69 passes through a slotted hole 68*b* in the bracket so that the tension on spring 67 may be easily adjusted. A downwardly bent ear 68*c* of bracket 68, along with the spring anchoring ear 68*a* and the screw 69 maintain the bracket in alignment.

An upwardly projecting arm 70, secured to the other end of the rock shaft 60 is connected in conventional manner to the escapement mechanism by the link 71. The link is pivotally secured to the arm 70 by a shouldered screw 72 and is slidably secured to the bracket 12 by a shouldered screw 73 extending through the slotted hole 74 in the link 71. The rearward end of the link is provided with a projection 71*a* for engaging a portion of the rocker frome 13 to rock the escapement in the usual carriage advancing manner as indicated in broken lines in Figure 5.

While the operation of the above-described mechanism will now be apparent a brief description follows.

With the machine turned on so as to continuously rotate the snatch roll 28, the operator depresses the space bar 50 until the pad 53 rests upon the resiliently held stop 55*a* as shown in full lines in Figure 4. The rearward end of arm 50*d* of the space bar support is thereupon raised, as is the rearward end of the pawl tripping lever 42, by reason of the engagement of the pin 52 in the slot 50*e*. The trigger 45 is carried upward turning the pawl operating lever 37 counterclockwise as viewed in Figure 2. The pawl 35 is thereupon turned clockwise to its roll engaging limit and the actuating lever 30 is carried downward about its pivot 29.

As the actuating lever moves downward, the pawl 35 being held to its roll engaging limit by the engagement of pawl tooth 35*a* with the roll 28, the lever reaches a point where the tooth 35*a* rolls free of the roll 28. The pawl operating lever is now free of the trigger 45, as shown in Figure 4, and pawl 35 is thereupon rotated back to its rest position by the action of spring 39 as shown.

As the actuating lever **30** moves downward the pin **64** moves forward in the slot **63** and the rock shaft operating arm **62** is cammed downward. Shaft **60** is rotated and link **71** is drawn forward to operate the escapement in the usual manner.

The control lever **65** is engaged with the pin **64** and is biased thereagainst by spring **67** which may be precisely adjusted for tension by means of the adjustably secured bracket **68**. As the pin **64** moves forward in slot **63**, it will be seen that it meets with an initial maximum resistance which is increasingly lessened as the pin moves forward in the slot by reason of the increasingly angular disposition of the arm **65***a* with respect to the cam slot. It will be noted that spring **67** is under almost constant and unvaried tension from rest to actuated position by reason of the disposition of its anchor points **65***c* and **68***a*.

It will be apparent that by providing the precisely controlled camming action between pin **64** and operating lever **62**, in which the pin **64** travels a markedly greater distance than the distance traveled by the rearward end **71***a* of the link **71**, a sure and positive operation of the escapement mechanism ensues. Moreover the resilient and decreasing resistance provided by the control lever **65** parallels the resistance afforded by the type actions in the same machine, using almost identically the same parts, which results in uniformity of action and savings in cost. The spring resistance of the lever **65**, furthermore, slows down the spacing stroke without interfering with or slowing down the speedy return stroke which is necessary for the efficient operation of the escapement mechanism.

Upon the return stroke of the actuating lever, the upward force exerted by the actuator lever return spring **32** is augmented by the force exerted by the spring **67**, transmitted through the arm **65***a* of the control lever to the pin **64**. The rearward end **71***a* of the link is withdrawn and the escapement rocker **13** returns to its rest position under the propulsion of its own return spring **15** just as it does in the manual machine.

The actuator lever **30**, having returned to rest position, the pawl operating lever **37** is carried rearward again. Even though the operator may not have released the space bar and the trigger **45** is therefore in raised position, the operating lever **37** in moving rearward will not be turned but will carry the upper end of the trigger **45** rearward against the action of spring **47**. When space bar **50** is again released, the trigger **45** will be again lowered and its upper end **45***b* will be returned under the end **37***b* of the pawl operating lever by the spring **47**.

Should repeat action of the spacing mechanism be desired, the operator depresses the space bar **50** to its abnormal and ultimate limit, stretching the spring **56** until the stops **50***c* contact the front plate of the frame **10**. The forward end of the pawl operating lever **37** is again raised and the escapement mechanism is operated as before.

Upon return of the actuating lever **30** toward rest position, however, the repeat stop arm **42***a* of the pawl tripping lever has been turned to a position contacting the rearward end of the fulcrum bar **27** by reason of the abnormal depression of the space bar **50** as shown in broken lines in Figure 4. The upper edge of the stop arm **42***a* is therefore elevated to a position which intercepts and cams upward the rearwardly returning end **37***b* of the pawl operating lever before the actuator lever **30** reaches its position of rest. The pawl **35** is turned again to its roll engaging limit and the escapement is operated repeatedly until the space bar **50** is released.

While there is herein described, and in the drawings shown, an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto, but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention. I desire to be limited, therefore, only by the scope of the appended claims.

I claim:

1. In a power operated typewriter or like machine, a frame, a carriage mounted on said frame for letter spacing travel, a carriage escapement mechanism adapted to be operated for effecting incremental letter spacing movements of the carriage, a power driven rotary member for effecting the movement of the instrumentalities of the typewriter, means including an actuator lever adapted to be moved in a curved path by said rotary member from a rest position to an operated position, control means including a keyboard space bar for initiating the movement of said actuator lever from rest to operated position, a rock shaft journaled in said frame, a first arm secured to said shaft and connected to said escapement mechanism for operation thereof, a second operating arm secured to said shaft and having cam means thereon, a cooperating cam engaging part borne on said actuating lever and adapted to oscillate said operating arm to rock said shaft during movement of said actuator lever from rest to operated position, and a control lever pivotally secured to said operating arm and engaging said cam engaging part, said control lever being spring biased to resist the movement of said cam engaging part with respect to said cam means during movement of said actuator lever from rest to operated position and to assist the movement of said cooperating parts during the return movement of said actuator lever from operated to rest position.

2. A power operated typewriter as claimed in claim 1, wherein said carriage escapement mechanism and said actuator lever are each provided with a return spring for returning said mechanism and said lever respectively from operated to rest position.

3. The combination with a typewriter having an escapement mechanism and a power-driven rotary toothed member, of an actuator lever pivotally secured adjacent said toothed member for oscillatory movement from rest to actuated position, a pawl oscillatably carried on said actuator lever for engagement with said toothed member for moving said lever from rest to operated position, space bar controlled means for moving said pawl into engagement with said toothed member, a rock shaft journaled in the frame of said typewriter, a first arm secured to said shaft and connected to said escapement mechanism for effecting letter spacing operation of said typewriter upon rocking of said shaft, a second operating arm secured to said shaft, said operating arm having a cam slot therein adjacent said actuator lever, a camming pin borne on said actuator lever and engaged in said cam slot for transmitting oscillatory movement of said actuator lever to said operating arm, and spring means for resisting the movement of said pin in said cam slot on the operating stroke of said actuator lever and for assisting the return of said actuator lever to rest position.

4. The combination claimed in claim 3 wherein said spring means comprises a control lever pivotally carried on said operating arm and engaging said actuator lever borne pin, said control lever being spring biased to resist the movement of said pin in said cam slot.

5. The combination claimed in claim 4 wherein said spring biased control lever is adapted to move from a position substantially across said cam slot when said actuator lever is in rest position to a position at a substantial angle to said slot when said actuator lever reaches its operated position.

6. The combination claimed in claim 3 wherein said space bar controlled means comprises a rock shaft on which the space bar is mounted for substantially vertical oscillatory movement and spring biased to an upper rest position, a stop lever pivotally mounted coaxially with said space bar rock shaft and spring biased to a first stop position adapted to contact a portion of said space bar upon normal depression of the bar, said stop lever being

adapted to be carried by said bar to a second repeat stop position upon abnormal depression of the bar, said space bar being operatively connected to a pawl tripping lever adjacent said actuator lever, a pawl operating lever carried on and projecting from said actuating lever, a trigger arm projecting from said tripping lever and adapted to operate said pawl operating lever when the space bar is normally depressed and to be swung aside when said actuator lever returns from operated to rest position for non-repeat spacing, and a second projecting arm on said

tripping lever adapted to operate said pawl operating lever when the space bar is abnormally depressed and on return of said actuator lever from operated to rest position for repeat spacing.

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