Aug. 15, 1961 J. C. MORRIS 2,996,165

LETTER SPACE EXTEND MECHANISM FOR TYPEWRITERS

Filed April 24, 1959 2 Sheets-Sheet 1

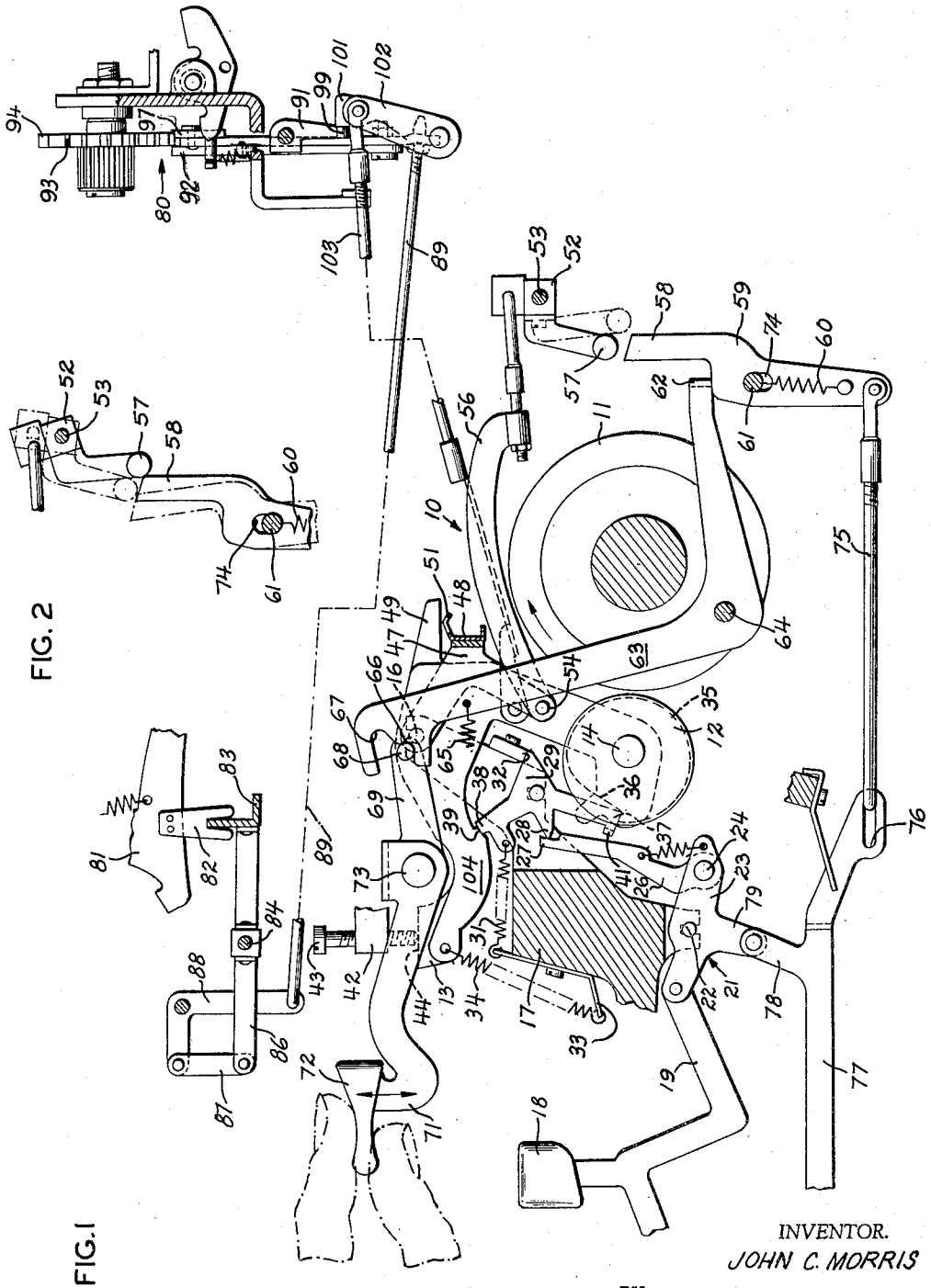


FIG. 2

FIG. 1

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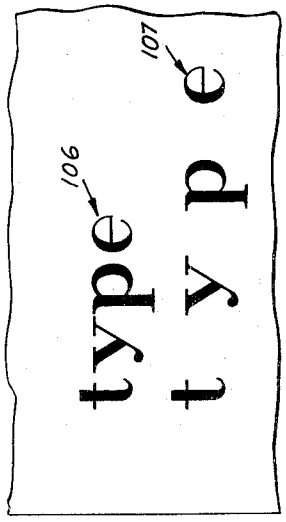


FIG. 7

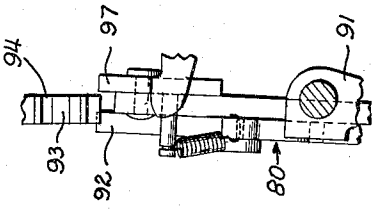


FIG. 5

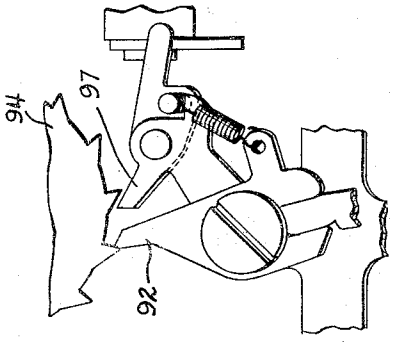


FIG. 4

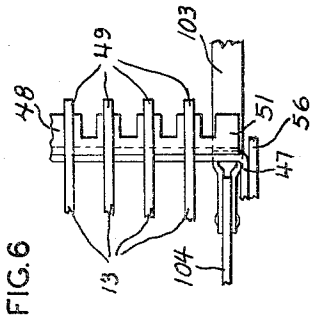


FIG. 6

FIG. 3

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LETTER SPACE EXTEND MECHANISM FOR TYPEWRITERS

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9 Claims. (Cl. 197—84)

This invention relates to typewriters and in particular to a spacing device and ribbon control means associated with the power mechanism thereof.

One object of the invention is to incorporate in a power mechanism unit a ribbon universal bar and a mechanism for extending the space between typed characters whereby adjustment of the ribbon universal bar may be accomplished without affecting the adjustment of the ribbon operating mechanism and before the power unit is assembled into the machine.

Another object of the invention is to provide an extend feature which will enable the typist to condition the machine for extended spacing between characters and in which the control of the timing of the extend feature may be adjusted through the ribbon universal bar.

A further object of the invention is to provide an extend feature, in connection with a power driven writing machine, which will enable the typist to condition the machine for an extended spacing between characters.

Another object is to achieve an extended letter spacing operation in a machine having a regular carriage escapement mechanism without modifying the escapement mechanism in any way, thus appreciably lowering the cost of obtaining this effect with a much simplified mechanism.

Other objects and structural details of the invention will be apparent from the following description when read in connection with the accompanying drawings, in which:

FIGURE 1 is a view in front to rear elevational section of the power mechanism of a typewriter to which my invention has been applied.

FIGURE 2 is an enlarged sectional view of the ribbon actuating and extend control means used in connection with the invention,

FIGURE 3 is a view in front elevation of a carriage escapement mechanism used,

FIGURE 4 is an enlarged fragmentary portion of the dog rocker, used in the escapement mechanism, in one operational position,

FIGURE 5 is an end view of the escapement mechanism shown in FIGURE 3 and illustrating an actuated position of the dog rocker,

FIGURE 6 is a fragmentary plan view of one end of the ribbon univeral bar showing the relation of the adjustable ears to the power arms, and

FIGURE 7 is an example of the extended spacing between characters in comparison to the regular type spacing.

Referring to the drawings in detail, **10** indicates generally one unit of the power mechanism of a typewriter, which includes a power driven roll **11** journalled in side frames and having an eccentrically mounted power arm cam **12** for operating engagement with the roll to cyclically oscillate a type bar power arm **13**. The cam **12** is pivoted as at **14** to the arm **13** which, in turn is pivoted on a rod **16** in the upper end of a cross bar **17** which extends between the side frames of the machine and is slotted to locate the arm **13** and its associated parts.

When one of the keys **18** of the keyboard is depressed, its shank extension **19** rocks a trip bell crank **21** of T form and pivoted on a rod **22** carried in the under

serrated side of the bar **17**. One arm **23** of the bell crank **21** has pivoted thereto, as at **24**, a trip trigger **26**, spring biased in clockwise direction for engagement, at its upper shouldered end **27**, with the nose **28** of a latch **29**. The latter is biased, by a spring **31**, in counterclockwise direction against a stop bar **32**, the spring being secured at one end to a bracket **33** to the latter of which is also secured a spring **34** for urging the power arm **13** in counterclockwise direction so that the cam **12** will engage the power roll **11** when the trigger **26** is lifted by the rocking movement of the bell crank **21**, and the upper end **38** of the latch rides off a seat **39** on the underside of said power arm **13**.

The cam **12**, which may have a knurled surface, is normally spaced very slightly from the roll **11** and is provided with an annular groove **35** which gradually deepens to provide a latch recess **36** at one end of said groove. When the latch **29** is swung clockwise by the trigger **26** the upper end **38** of the latch will move out from beneath a seat portion **39** on the underside of the power arm **13** and the spring **34** will then swing the arm **13** counterclockwise to engage the cam **12** with the roll **11**. When the cam **12** rotates in contact with the power roll **11**, the latch **29** is further swung clockwise not only by the eccentric movement of the cam but by the toe end **37** of the latch riding out of the recess **36** into the groove **35** which combined action imparts a quick clockwise movement to the latch so that a tab **41** on the toe end **37** of the latch **29** engages the trigger **26** and holds it at an inoperative position until the toe end **37** of the latch snaps into the recess **36** to let the shouldered upper end **27** of the trigger engage the nose **28** of the latch **29**, and to let the upper end **38** of the latch **29** come to rest beneath the seat **39** on the power arm **13**.

As the power arm swings clockwise about its pivot **16** it lifts a type bar operating lever **42**, which, through suitable linkage, actuates the type bar action of a noiseless typewriter of the kind shown in Patent No. 2,862,591 issued to E. G. Israelson on December 2, 1958 and in which the operating lever **47** therein corresponds to the above lever **42**. Each lever **42** carries an adjusting screw **43** for engagement by the lift end **44** of each power arm **13**.

At the opposite ends of the bank of power mechanisms the rod or shaft **16** is carried in the side walls of a frame and has pivoted thereon the bell crank bail ends **47** of a ribbon universal bar **48** which extends across the power unit and underlies extensions **49** formed on each of the power arms **13**, except on a spacing power arm to be later referred to. The upper edge of the ribbon universal bar **48** is slotted so that the material between the slots constitutes ears **51** which underlie the extensions **49** of the power arms **13**. The ears may be bent to vary the time of engagement of the extensions therewith and thus provide an adjustment for timing the throw of the ribbon actuator bar **52** which is pivoted as at **53**, at its ends, in a suitable supporting part of the frame. When any of the power arms is operated, the extension thereof **49** moving clockwise will push down on the ears **51** of the universal bar **48** which, in turn, will rock the bail ends **47** of the ribbon universal bar **48** about pivot **16**. The bails at each end of the bank of power arms **13** are connected, at the lower ends of their depending arms **54**, through adjustable link means **56**, with the ribbon-actuator bar **52**.

The actuator bar **52**, adjacent one end thereof, is provided with a tappet **57** which overlies the upper end **58** of a lift arm **59** which is biased upwardly by a spring **60** connected to a frame supported pivot pin **61** but normally retained in its lower position by the tab end **62** of a bell-crank extend lever **63** suitably pivoted, as at

64, to the side frame and pulled forwardly by a spring 65. The upper end of the extend lever 63 is shaped to provide a cam cut-off including a shallow notch 66 and a contiguous deeper notch 67 into the latter of which a pin 68, on the free end of the shank 69 of an extend key lever 71, may move when the extend key 72 is depressed.

The key lever 71 is pivoted in the side frame as at 73 and when it is in its normal or raised position its pin 68 will be seated in the shallow notch 66 to maintain the extend lever at its furthest clockwise position to prevent the lift arm 59 from being raised by its spring 61. When the extend key 72 is pushed down, the pin 68 will seat in the deep notch 67, under pressure of the spring biased lift arm 59, and the latter will then be limited in its upward movement by the length of the slot 74 therein, or by contact with the underside of the tappet 57.

The lower end of the lift arm 59 is pivoted to one end of an adjustable rod 75 whose opposite end engages a slot 76 in one end of a sub-lever 77 provided with an extension 78 for pivoted connection with a depending leg 79 of the trip bell crank 21.

For the purpose of providing the regular spacing operation of the escapement mechanism, indicated generally as at 80 in FIGURE 1, the regular Noiseless type action, as shown in Patent No. 2,862,591 above referred to, includes for each key action a pivoted throw arm 81, corresponding to the throw arm 27 of the above patent, and whose downward movement, through a saddle 82, rocks a bail 83 secured to a rock bar 84 whose rocking motion, through arm 86 and link 87, swings a bell crank 88 clockwise to pull on a wire 89 which swings the dog rocker 91 (FIGURE 3) of the escapement mechanism 80. The initial swing of the rocker 91 places the spring biased dog 92 in the path of the next adjacent tooth 93 of the escapement wheel 94 which, under the usual moving pressure of the carriage rack 96, allows the carriage to move in the first partial letter space movement which is completed when the detent dog 97 is swung back into alignment with the wheel 94 by the spring 98. The rocker 91 is provided with a toe 99 which engages the arm 101 of a space rocker 102 which in turn is actuated by a rod 103 connecting it to a space power arm 104 which does not actuate any of the levers 42.

This normal movement of the escapement mechanism produces regular spacing operation as shown in the upper line of FIGURE 7, as at 106. In the operation of the space extend mechanism, the operator, wishing to print a heading, for instance as at 107 in FIGURE 7, depresses the extend key 72 to move the pin 68 upwardly so that the extend lever 63 will be swung counterclockwise by the spring 65. When a character key 18 is depressed it raises the trip trigger 26 and swings the latch 29, against the resistance of its spring 31, from beneath the seat 39 of the power arm 13 which corresponds to the character key operated. The power arm will then be swung counterclockwise by its spring 34 to cause the eccentric cam 12 to engage the power roll 11. The latter will, in revolving cam 12, cause it to swing the power arm 13 in clockwise direction so that its lift end 44 will actuate the type bar operating lever 42 and its extension 49 will push down on the ribbon universal bar 48 to rock the bail ends 47 and through the links 56 actuate the ribbon bar 52 to raise the ribbon vibrator (not shown). The latter movement of the bar 52 will move the tappet 57 off the upper end of the lift link 59 and the parts will assume the relative positions shown in FIG. 2.

On the return motion of the power mechanism, in counterclockwise direction, which restores the parts to the positions shown in FIG. 1, the tappet 57 will swing the lift arm 59 counterclockwise about its pivot pin 61 and pull on rod 75 to cause sub-lever 77 to rock the trip bell crank 21 and lift the trigger 26. This will initiate action of the space power arm 104 of the power mechanism to pull on the rod 103 and, through the space rocker 102, automatically operate the escapement mechanism 80 to provide an extended space between characters as shown at 107 in FIG. 6. When the extend feature is to be disabled, the operator lifts the extend key 72 which cams the pin 68 into the shallow notch 66 to depress the lift arm 59 and retain it at the position shown in FIG. 1.

As above pointed out, the keyboard and power mechanism is embodied in a removable frame set within the regular side frames of the machine and the ribbon universal bar 48 can be adjusted by the bending of the ears 51 before assembly into the typewriter. The adjustment of the ribbon mechanism, exemplified by the ribbon actuator bar 52, is not affected by the adjustment of the universal bar 48 since both are now independently adjustable. The ears 51 also control the timing of the operation of the tappet 57 so that precise operation of the extend spacing action is provided by bending the ears to suit.

Another feature of the mechanism is that no feed of the ribbon takes place during the extend spacing operation because the power arm 104 lacks an extension 49 and the ribbon universal bar 48 is not operated and the bar 52 which operates the ribbon is not actuated with the result that a saving of ribbon occurs in each extend operation. Only the rod 103 is pulled by the operation of the space or extend power arm 104 to impart the necessary spacing operation to the dogs 92 and 97 through the space rocker 102, which adds another space between the characters.

While I have shown and described what I consider to be a highly desirable embodiment of my invention, it is obvious that changes in form could be made without departing from the spirit of my invention, and I therefore do not limit myself to the exact form herein shown and described nor to anything less than the whole of my invention as hereinbefore set forth and as hereinafter claimed.

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

1. In a typewriter having a printing type bar means, a key mechanism and a platen, the combination with power mechanism including power roll means and power arm means movable by said roll means for operating said printing type bar means under control of said key mechanism; of escapement means for governing character spacing movements of said platen carriage in accordance with the operation of said type bar means, and pre-set means controlled by said power arms means for extending the spacing movements of said carriage through said escapement means independently of the operation of said type bar means.

2. In a typewriter having printing type bar means, a key mechanism and a platen carriage, the combination with power mechanism including power roll means and power arm means movable by said roll means for operating said printing type bar means under control of said key mechanism; of ribbon moving means, ribbon universal bar means actuated by said power arm means for operating said ribbon moving means, escapement means for governing character spacing movements of said platen carriage in accordance with the operation of said type bar means, pre-set means for extending the spacing movements of said carriage through said escapement means independently of the operation of said type bar means, and means operated by said ribbon moving means for controlling the operation of said extending means.

3. In a power operated typewriter having printing type bar means, a key mechanism, ribbon operating means and a movable platen carriage, power roll means, power arm means movable by said roll means for operating said printing type bar means under control of said key mechanism, escapement means for governing character spacing movements of said platen carriage in accordance with the operation of said type bar means, additional power means, pre-set means for controlling operation of said additional power arm means, and means controlled

by said pre-set means and operated by said ribbon operating means for initiating action of said additional power arm means for extending the spacing movements of the platen carriage through said escapement means independently of the operation of said type bar means.

4. In a typewriter having a keyboard and printing type bars, the combination with a power mechanism for operating said printing type bars under control of said keyboard; escapement means for providing a single space movement between characters being printed, ribbon actuating means operated by said power mechanism, additional power mechanism, means controlled by said ribbon actuating means for initiating operation of the additional power mechanism independently of said keyboard control, pre-set means for conditioning said operation initiating means for operation by said ribbon actuating means, and means operated by said additional power mechanism for operating said escapement means to further extend said single space increment.

5. In a power operated typewriter having printing type bar means, a key mechanism, and a movable platen carriage, power roll means, power arm means movable by said roll means for operating said printing type bar means under control of said key mechanism, escapement means for governing character spacing movements of said platen carriage, additional power arm means and pre-set means for controlling the operation of said additional power arm means, ribbon operating means controlled by said power arm means, and means controlled by said pre-set means and operated by said ribbon operating means for initiating action of said additional power arm means for extending the spacing movements of the platen carriage through said escapement means.

6. In a typewriter, a printing mechanism, carriage spacing escapement means operated by said printing mechanism, power means for operating said printing mechanism comprising a bank of power arms, keyboard means for controlling the operation of said power arms, ribbon operating means, ribbon universal bar means operated by said power arms for actuating said ribbon operating means, an additional power arm adapted to actuate said escapement means, and space extending conditioning means operated by the ribbon operating means for initiating a spacing action of said escapement actuating power arm independently of said keyboard power arm controlling means.

7. In a typewriter, printing means, keyboard controlled power means for operating said printing means, escapement means controlled by said printing means for normally spacing characters being printed, said escapement means including a space rocker and said power means including space rocker operating means, ribbon operating means, a ribbon universal bar operated by said power means for actuating said ribbon operating means, lift arm means, space extending lever means key conditioned for releasing said lift arm means for rising movement in the path of said ribbon operating means, and means movable by said lift arm means for initiating operation of said space rocker operating means to add an increment of space to the normal spacing of characters being printed independently of the normal spacing control of said escapement means by said printing means.

8. In a typewriter, printing means, key controlled power means for operating said printing means, escapement means controlled by said printing means for normally spacing characters being printed, power means for operating the escapement means to extend the normal spacing between characters and pre-set key controlled means for conditioning said escapement operating power means for operation automatically after each normal spacing action of said escapement means.

9. In a typewriter of the character set forth in claim 8, a ribbon universal bar operated by said key controlled power means, ribbon operating means operated by said universal bar coacting with said pre-set key controlled conditioning means for initiating said automatic operation of the escapement operating power means and means on said ribbon universal bar for adjusting the time of operation of said ribbon operating means.

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