

Nov. 14, 1967

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PLURAL SPACE BAR OPERATED MECHANISM FOR CONTROLLING
PROPORTIONAL ESCAPEMENTS

3,352,399

Filed Sept. 7, 1965

2 Sheets-Sheet 1

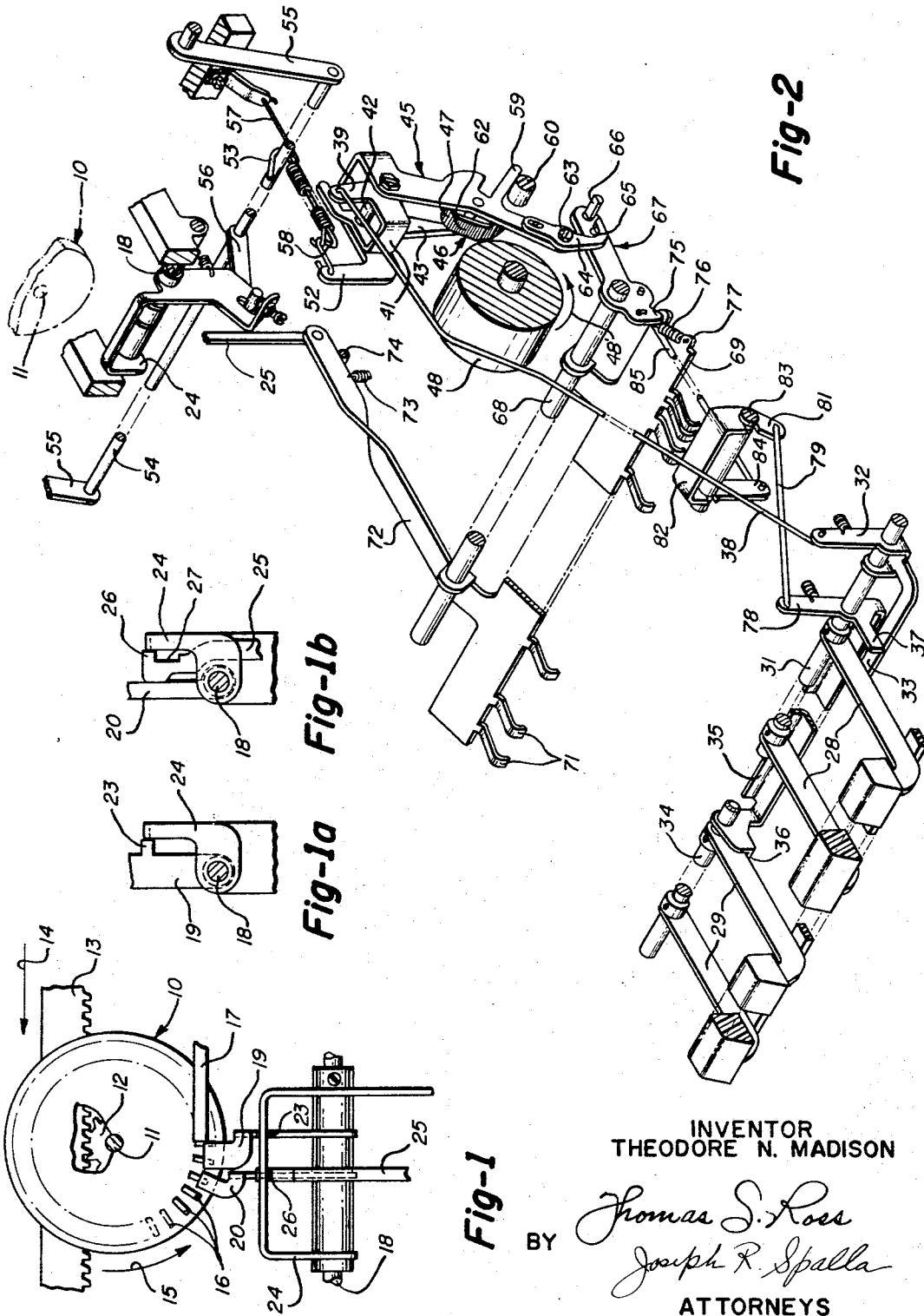


Fig-1

Fig-2

Fig-1a

Fig-1b

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Fig -3

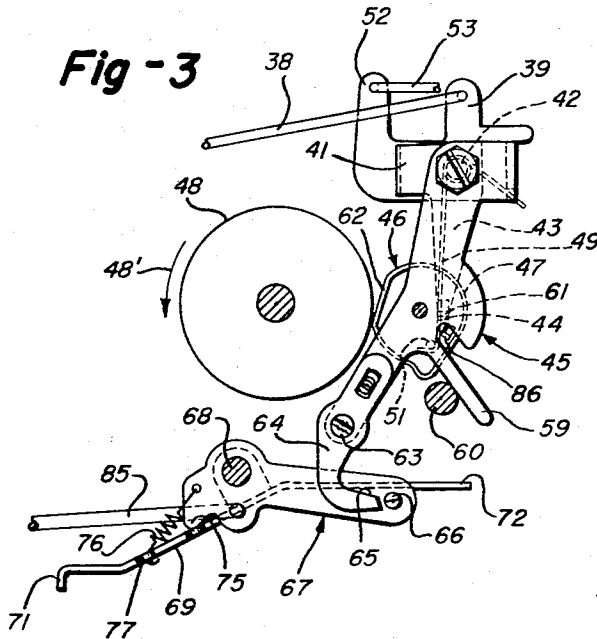


Fig-4

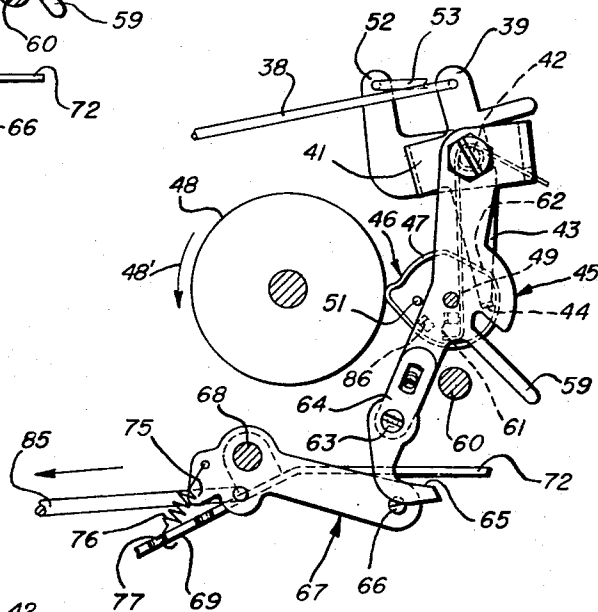
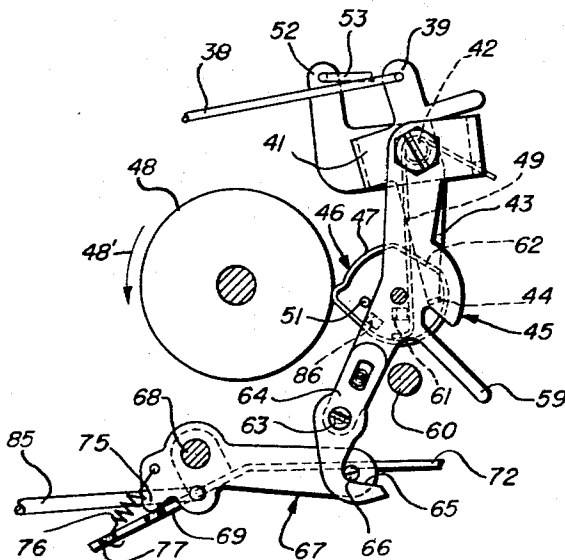


Fig-5



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3,352,399 PLURAL SPACE BAR OPERATED MECHANISM FOR CONTROLLING PROPORTIONAL ESCAPE- MENTS

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ABSTRACT OF THE DISCLOSURE

A single power action responsive to depression of either a two or a three unit spacebar serves to power operate a proportional escapement release member which is operative in association with a two unit space determining element to effect two units of spacing and with a normally operatively positioned three unit space determining element to effect an additional unit of spacing. The action also serves to power operate, through a normally enabled connection, the three unit space determining element to an inoperative position incident to depression of the two unit spacebar, the connection being disabled incident to depression of the three unit spacebar.

This invention relates to plural space bar operated mechanism for controlling proportional escapements to effect two or three space units of carriage movement; more particularly it relates to mechanism characterized by a single power arm operably responsive to depression of a two or three unit space bar to cycle an escapement release member and further characterized by mechanism for normally connecting said power arm to position a space unit determining element for operation by said member incident to depression of one of said space bars and for disabling the connection between said power arm and space determining element incident to depression of the other of said space bars.

Most proportional spacing typewriters are provided with two space bars one to effect two units of carriage spacing and the other to effect three units of carriage spacing as desired between words. Each space bar is associated with and triggers an action individual thereto, said actions being connected to cycle an escapement release member. Where three units of space between words is normally desired, the escapement is normally conditioned to measure out three units of space in response to operation of the release member incident to three unit space bar depression and when two units of space are desired the action triggered by the two unit space bar depression must condition the escapement for two units of spacing upon operation by the release member.

In the present invention a single power action responsive to both space bars serves to operate an escapement release member and to power operate the mechanism for conditioning space determining elements for operation by the escapement release member to effect two or three units of spacing. The above arrangement as will be particularly described herein reduces the number of parts required with concomitant savings in the cost of manufacture and servicing.

An object of the invention is to provide a single action operative by either of a pair of spacing keys to cycle an escapement release member and which is power connectable or disconnectable with a space unit conditioning element depending on which of the pair of space bars is operated.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following

detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIGURE 1 is an elevational view of a carriage movement controlling escapement;

FIGURES 1a and 1b are fragmentary views showing details of space unit determining elements associated with the escapement;

FIGURE 2 is a perspective view of the single action associated with two and three unit space bars operatively associated with escapement conditioning and release elements;

FIGURE 3 is an elevational view of the single action in normal inactive position;

FIGURE 4 is an elevational view showing the single action and conditioning elements in an active condition incident to depression of a three unit space bar;

FIGURE 5 is an elevational view showing the single action and conditioning elements in an active position incident to depression of the two unit space bar.

Referring now to the drawings wherein like reference numerals designate like or corresponding elements throughout the several views and wherein a preferred embodiment is illustrated there is shown in FIGURE 1 an escapement disc or wheel generally designated by reference numeral 10 which is rotatably mounted on a frame supported shaft 11. Connected to rotate with the wheel is a gear 12 that meshes with a rack 13 carried by the carriage; the latter and the escapement disc 10 respectively being urged in the direction of the arrows 14 and 15 as by connection to a spring drum (not shown).

As fully disclosed in Patent No. 3,018,870 the wheel carries about its circumference at intervals corresponding to a unit of carriage movement a plurality of stop members 16. The stop members 16 are adapted for sliding movement in a direction parallel to the axis of shaft 11 in slots formed in the disc between set or operative positions and unset or inoperative positions wherein the forward end of each stop member 16 is flush with the face of the wheel as viewed in FIGURE 1. A stationary stop 17 lies in the path of set stop members 16 to arrest the rotation of the disc. To release the escapement disc for controlled movement of the carriage over selected unit distances requires that one or more stop members 16 immediately preceding the stationary stop 17 be moved to unset positions thereby to permit the disc to rotate until the first set stop member following the unset stop members encounters the stationary stop, thus permitting carriage movement through a corresponding distance. To move the stop members 16 to unset position there are provided space determining elements or stop member displacing fingers pivotally mounted on a frame supported shaft 18. As shown in FIGURE 1 a first or two unit stop member displacing finger 19 has a width which overlies the two stop members 16 preceding the stationary stop 17, and a second or three unit stop member displacing finger 20 overlies the next succeeding or third stop member preceding the stationary stop.

As viewed in FIGURE 1a the two unit stop member displacing finger has a forwardly extending projection 23 adapted to be engaged by an escapement release bail 24 also pivotally mounted on shaft 18 whereby when the bail 24 is rocked the finger 19 is moved to displace two stop members to unset position.

As viewed in FIGURES 1 and 1b the three unit finger 20 lies rearwardly of an interposer or escapement conditioning element 25 which has a projection 26 on its upper end adapted when the interposer is positioned as shown in FIGURE 1b to be engaged by the release bail 24 and in turn to engage and rock the three unit finger 20 thus to displace the third stop member. When the

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interposer 25 is raised, as will hereinafter appear, a notch 27 on the upper end of the interposer below the projection 26 will be presented to the bail 24 whereby when the latter is rocked it will not engage the interposer and hence the three unit finger 20 will not be rocked.

In the description to follow the lowered position of the interposer 25, as illustrated in FIGURE 1b, is a normal position since a three unit interword space is more frequently used. When a two unit space is desired the interposer 25 will be raised to an inoperative position with its notch 27 opposite bail 24. However it is to be understood that where a two unit space is to be more frequently used, the position of the notch 27 and projection 26 may be reversed, such that when a two unit space is called the interposer 25 in its normal or lower position (notch opposite bail) will be inoperative and when a three unit space is called it will move upwardly to a raised position (projection opposite bail) so as to be operative on its displacing finger.

With reference now to FIGURE 2 there are shown two and three unit space bar supporting lever pairs 28 and 29 respectively. The two unit space bar levers 28 are secured to a rock shaft 31 which pivotally mounts an action initiating lever 32 having a forwardly and laterally extending section 33 which underlies one of the two unit space bar levers 28 whereby when the two unit space bar lever is depressed the lever 32 will be rocked counterclockwise about shaft 31. The three unit space bar levers 29 are secured to another rock shaft 34 axially spaced from rock shaft 31. A bail member 35 is provided with its opposite ends pivotally mounted respectively on rock shafts 34 and 31 and having at its left end a portion 36 underlying one of the three unit levers 29 whereby it is rocked counterclockwise upon depression thereof. The right end of member 35 has a forward projection 37 which overlies the extension 33 of the action initiating lever 32 whereby when it is rocked counterclockwise it in turn rocks the action initiating lever 32 is operated by both the two and three unit space bars. The action initiating lever has an upwardly extending arm which is connected as by a link 38 to an upstanding arm 39 of an action trip lever 41 pivoted on a frame supported shaft 42 and having a depending trip arm 43 with a bent off end 44 (FIGURES 3-5).

A power arm generally designated 45 comprising the escapement action is also pivoted on shaft 42 and rotatably supports below the pivot shaft 42 a roll cam 46 which is rotatively biased to effect engagement of its eccentric thread 47 with a continuously driven roll 48 by a spring 49, acting as viewed in FIGURE 3, against a pin 51 extending from the side of the roll cam. The power arm 45 has an arm 52 above its pivot which is connected by a link 53 to a cross shaft 54 supported by arms 55 pivotally mounted in the machine frame. The motion of the cross shaft is coupled as by a link 56 to the escapement release bail 24. The power arm and escapement bail are biased to normal position by a spring 57, one end of which is connected to a bent portion 58 of the link 53 and the other to the machine frame whereby the power arm 45 is biased clockwise to the position shown in FIGURE 3; a downwardly and rearwardly extending portion 59 of the power arm cooperates with a stop 60 to limit its clockwise movement.

The roll cam 46 is restrained from rotating about its axis for engagement of its thread portion with power roll 48 under the influence of spring 49 by engagement of a latch lug 61, formed by cutting and laterally bending the body portion of the cam, with the upper side of the bent off terminal portion 44 of the depending trip arm 43. In the normal position shown in FIGURE 3 a flat peripheral thread portion 62 of the cam is out of contact with the power roll. When the trip arm 43 is rocked counterclockwise by depression of either the two or three unit spacebar levers, the terminal portion 44 of the

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trip arm 43 will disengage the latch lug 61 and the spring 49 will rotate the roll cam into engagement with the power roll which, rotating in the direction of arrow 48', and due to the eccentric periphery of the roll cam will force the power arm to move counterclockwise as viewed in FIGURES 2-5, and drive the escapement release bail 24.

The lower end of the power arm supports, as by spaced screws to permit pivotal adjustment about the lowermost screw 63, a camming element 64 having a camming surface 65 operable when a two unit selection is called to engage a lug 66 extending from the rearwardly extending end of a two unit bail operating arm generally designated by reference 67. As viewed in FIGURE 2 the bail operating arm 67 is pivoted on a frame supported shaft 68 which also pivotally supports a two unit bail 69 extending across the machine and which is provided with forwardly extending camming fingers 71 located opposite or in the path of bell cranks associated with actions corresponding to characters assigned two unit widths as described in Patent No. 3,018,870.

The two unit bail also has a rearwardly extending lever 72 which is articulately connected at its end to the lower end of the three unit interposer 25 whereby when the bail is rocked counterclockwise either by a character action or by the space bail operating arm 67 the three unit interposer is raised to an ineffective position. A bail return spring 73 biases the bail against a frame stop 74. The bail operating arm 67 as viewed in FIGURES 1 and 3 has a projection 75 on its left end which normally is biased against the two unit bail 69 as by a spring 76 connected to an ear 77 on the right end of the bail 69 and the operating arm forward of its pivot, whereby if the arm is positioned as shown in FIGURE 3 and the action is tripped the camming element 65 on the power arm will engage the stud 66 and thereby rock the arm 67 as shown in FIGURE 5 in a counterclockwise direction whereby its left end projection 75 will bear down on the two unit bail 69 to rock the bail counterclockwise thus raising the interposer 25 to its ineffective position.

Referring again to FIGURE 2 the member 35 operated by the three unit key operated levers 29 is provided with an upstanding arm 78 that is connected as by a link 79 to one of the depending arms 81 of an inverted U-shaped lever 82 pivotally mounted on a frame supported shaft 83 thus to rock the lever clockwise when the three unit space bar lever is depressed. The other depending arm 84 of the U-shaped lever is connected as by a link 85 to the bail operating arm 67 thus to rock the arm clockwise to the position shown in FIGURE 4 wherein the bail operating arm projection 75 is spaced from the two unit bail and its stud 66 is lowered out of the path of the power arm camming element 65; thus the action will operate the escapement release bail 24 which will move the two unit finger, and via the undisturbed interposer 25, the three unit finger to displace three stops incident to three unit space bar depression.

As shown in FIGURES 3-5 the cam body is formed with a second or stop lug 86 which after substantially one revolution of the cam will engage the upper surface of the bent off terminal portion 44 of the trip arm 43 should the trip arm remain in the FIGURE 4 position by overlong depression of a space bar lever, thus preventing repeat actions.

In view of the above it will be understood that the single power arm 45 will be operative in response to depression of either space bar lever and will act, prior to operating the escapement release bail and incident to two unit space bar depression, to position the three unit bail to an inoperative raised position (notch 27 opposite bail 24). It is to be understood that the interposer 25 is but one element of the escapement conditioning mechanism which comprises lever 78, bail operating arm 67, and two unit bail 69.

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It should be understood that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

The invention claimed is:

1. In a machine having a normally arrested escapement member in control of a spring urged carriage and releasable to effect carriage movement over two or three space units,
 - a first and a second depressible space bar lever,
 - a continuously driven power roll,
 - a single rockably supported power arm,
 - an eccentric cam roll cam pivoted on said power arm adapted when rotated into engagement with said power roll to rock said power arm,
 - an escapement member release bail linked to said power arm and operative thereby,
 - control means responsive to depression of either of said space bar levers to rotate said cam into engagement with said power roll,
 - first means associated with said escapement member actuatable by said bail to effect two units of spacing,
 - second means associated with said escapement member adapted when actuated to effect an additional unit of spacing,
 - conditioning means positionable from a first position in the path of said bail to a second position out of the path of said bail, said conditioning means when actuated by said bail acting on said second means to effect said additional unit of spacing,
 - means drive connecting said conditioning means to said power arm to position said conditioning means to one of its said positions incident to depression of said first space bar lever,
 - and means disabling said drive connecting means incident to depression of said second space bar lever.
2. In a typewriter having an escapement mechanism comprising a wheel yieldably rotatably urged in one direction,
 - a plurality of stop members mounted in an annular

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array about the axis of said wheel and axially movable relative thereto between set and unset positions,

- a normally stationary stop positioned in the path of set stop members to arrest rotation of said wheel,
- a stop member unsetting bail for moving two stop members immediately preceding said stationary stop to unset positions,

two and three unit space bar levers,
 a single power arm rockable in response to depression of either of said space bar levers,
 means connecting said arm and said bail,
 interposer means positioned in the path of said bail and operable thereby to move a succeeding stop member beyond said two stop members incident to depression of said three unit space bar lever,
 and means operative by said power arm incident to depression of said two unit space bar lever to move said interposer out of the path of said bail.

3. A machine as recited in claim 1 wherein said power arm includes a cam element, and wherein said drive connecting means comprises a bail operating arm pivoted between its ends, a spring normally rotatably biasing said bail operating arm to locate one of its ends in the path of said cam element and its other end in contact with said conditioning means whereby rotation of said bail operating arm by said cam element will position said conditioning means to one of its said positions, and wherein said means disabling said drive connecting means comprises a link connected to rotate said bail operating arm from the path of said cam element.

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