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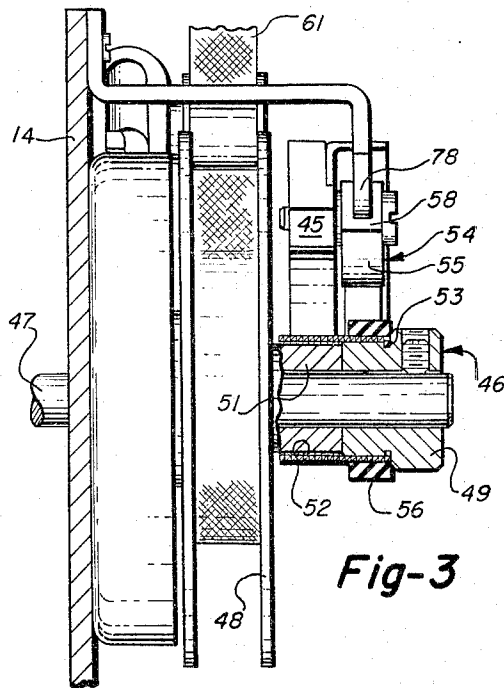
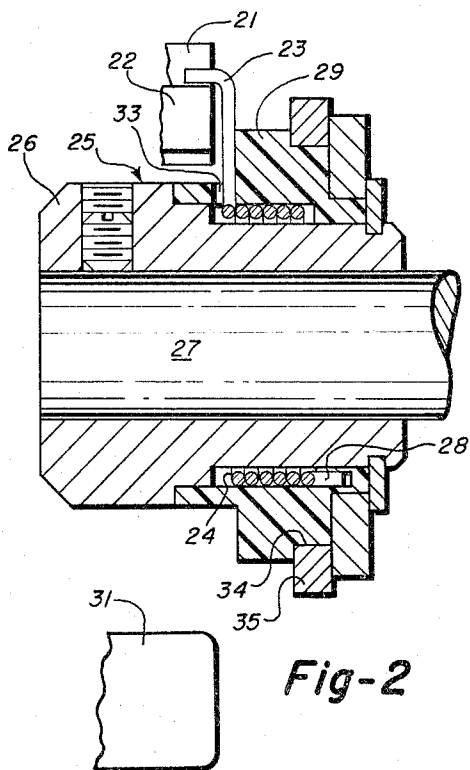
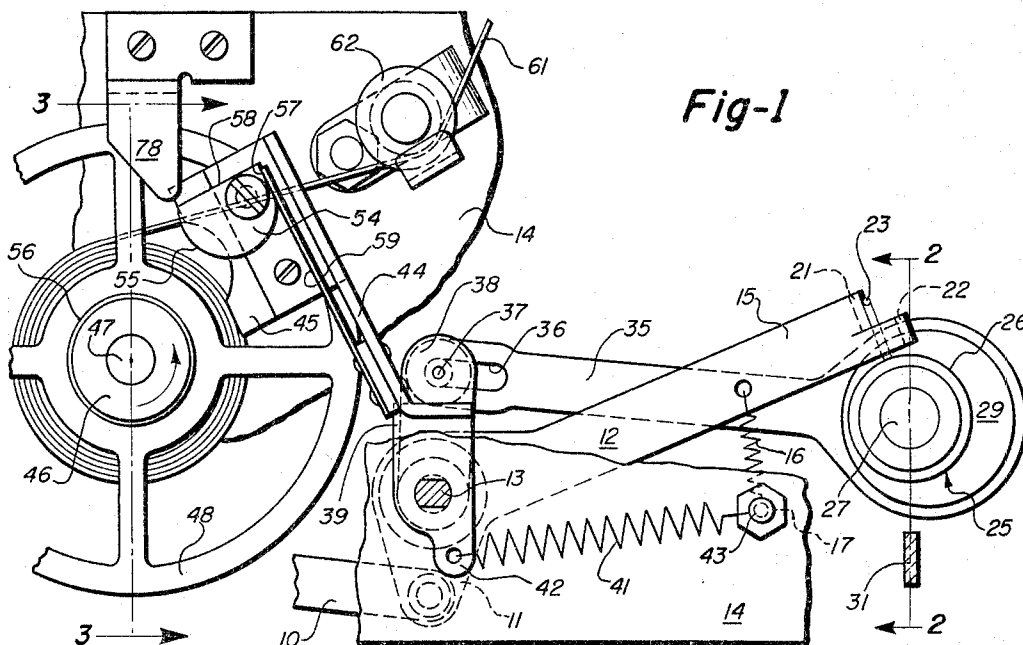
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3,276,561

CLUTCH ENGAGEMENT DELAY MECHANISM

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3 Sheets-Sheet 1



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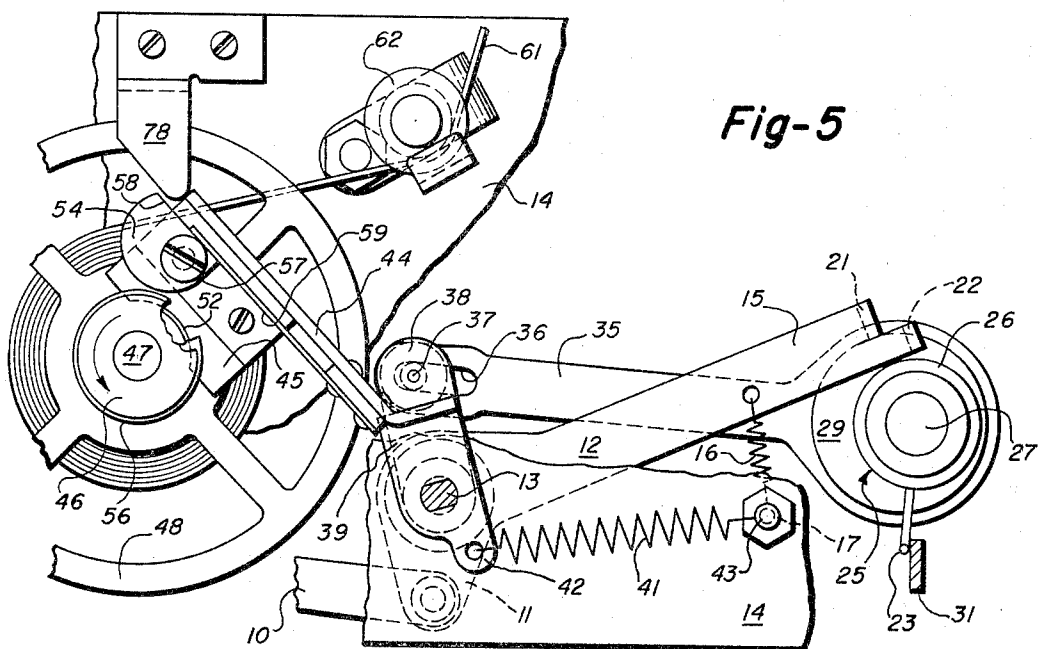
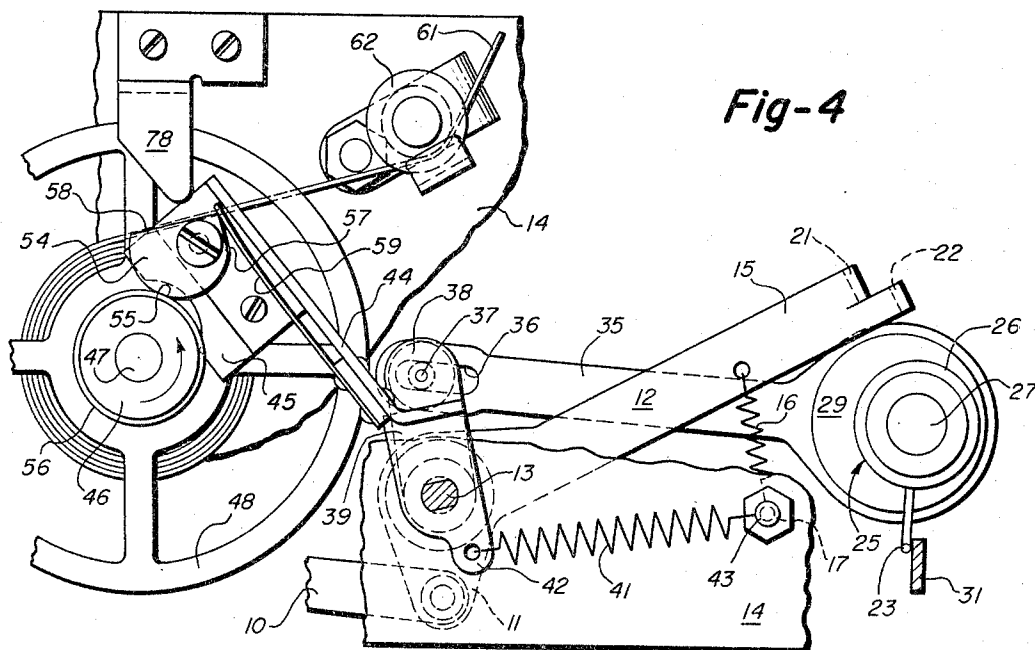
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CLUTCH ENGAGEMENT DELAY MECHANISM

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3 Sheets-Sheet 2



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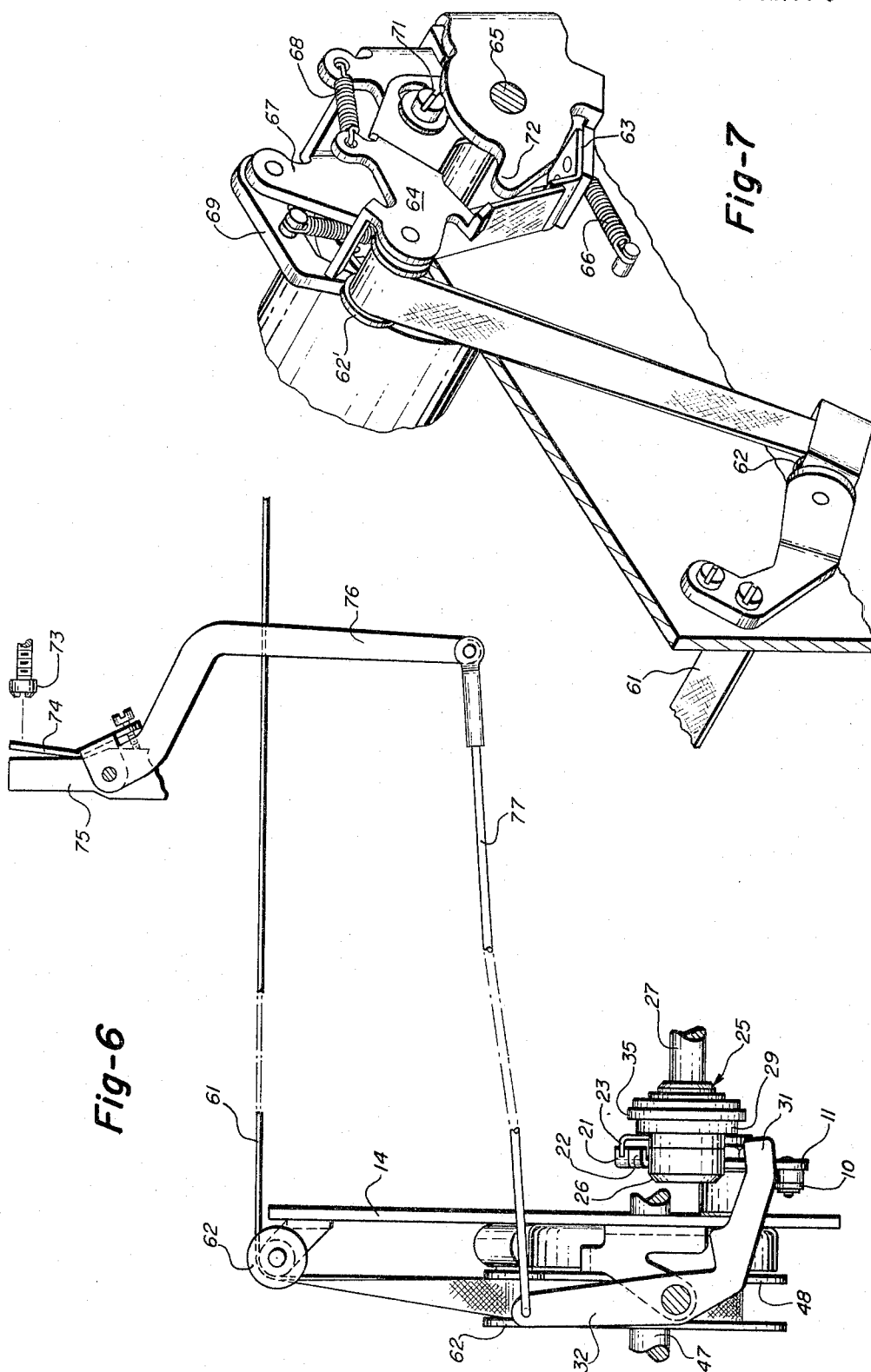
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CLUTCH ENGAGEMENT DELAY MECHANISM

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3 Sheets-Sheet 3



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3,276,561

CLUTCH ENGAGEMENT DELAY MECHANISM
 Fred W. Berg, West Hartford, Conn., assignor, by mesne
 assignments, to Royal Typewriter Company, Inc., New
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 5 Claims. (Cl. 197—65)

This invention relates to clutch engagement delay mechanism; more particularly it relates to clutch engagement delay mechanism characterized by an eccentric roll cam carried by a clutch actuator and operable in association with the driving element of a clutch to delay the movement of the clutch actuator to clutch engaging position.

Line feed mechanism in present day electric typewriters is associated with an is operative by the carriage return drawband to effect indexing prior to carriage movement. In these machines a carriage return key depression causes a carriage return clutch to engage and couple a power source to a drawband pulley to which one end of the carriage return drawband is secured thereby to wind the drawband. The other end of the drawband is secured to the carriage frame on the side of the machine opposite the drawband pulley via a number of directional guide pulleys, the last of which is mounted on a spring loaded indexing lever pivoted on the carriage frame and linked by a motion transmitting spring to a ratchet indexing pawl. After the indexing pawl has moved through its working stroke the indexing lever encounters an abutment on the carriage frame so that further pull on the drawband pulls the carriage until a margin stop on the latter encounters a carriage return clutch knockoff lever adjacent the center post of the machine. When this occurs the clutch is disengaged and the platen indexing lever and pawl, since the drawband is no longer being wound, are permitted to recover to normal position. With the carriage returned, repeat operation of the carriage return key engages the carriage return clutch to index the platen and immediately after the working stroke of the indexing mechanism the initial movement of the carriage disengages the carriage return clutch.

In machines employing carriage return clutches characterized in that the time between disengagement and reengagement of the clutch, incident to a repeat operation of the carriage return key, is less than the recovery time of the platen indexing lever and pawl, care must be taken by an operator to insure that sufficient time has elapsed for the indexing lever to return to start position before the carriage return key is again depressed, otherwise irregular line spacing may result.

The delay mechanism of the invention insures that a minimum time will elapse between repeat line space cycles to assure uniform spacing without requiring any attention on the part of the operator.

Briefly, the delay mechanism of the invention comprises a roll cam eccentrically rotatably mounted on the actuator arm of a wrap spring carriage return clutch. When the arm is actuated in response to depression of a carriage return key the roll cam engages a driving element of the clutch and rolls about its pivot connection to the actuator arm thereby maintaining a friction or drag shoe on the actuator arm away from the wrap spring over a predetermined interval, after which, the friction shoe encounters and causes the spring to wrap thereby to couple the driving and driven elements of the clutch.

An object of the invention therefore is in the provision of mechanism responsive to a clutch signal for delaying clutch engagement over a predetermined time interval.

Another object of the invention is in the provision of mechanism to assure full repeat cycles of line feed mechanism associated with the carriage return mechanism of a typewriter by delaying repeat engagement of the car-

riage return clutch incident to repeat operation of the typewriter carriage return key.

A further object of the invention is to provide clutch engagement delay mechanism for a wrap spring clutch which so controls engagement arm characteristics as to reduce any bounce tendency of the clutch actuator arm and to permit a gradual pick up of load by the clutch spring.

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 showing carriage return clutch actuator elements incorporating the delay mechanism of the invention in inactive positions;

FIGURE 2 is a cross sectional view of a power assist clutch taken along lines 2—2 of FIGURE 1;

FIGURE 3 is a cross sectional view taken along lines 3—3 of FIGURE 1;

FIGURE 4 is an elevational view similar to FIGURE 1 showing the elements in an active position prior to carriage return clutch engagement;

FIGURE 5 is an elevational view similar to FIGURES 1 and 4 showing the elements in an active position subsequent to the delay interval with the carriage return clutch engaged;

FIGURE 6 is an elevational view showing carriage return and associated carriage return knockoff elements; and

FIGURE 7 is a partial elevational view showing the connection of the drawband to the line feed indexing mechanism carried by the carriage.

Referring now to the drawings wherein like reference numerals designate like or corresponding elements throughout the several views there is shown in FIGURE 1 a link 10 which is adapted to be driven rearwardly in response to depression of a carriage return key (not shown). The rearwardmost end of the link 10 is articulately connected to the depending arm 11 of a lever 12 which is pivotally mounted on a stub shaft 13. The stub shaft as viewed in FIGURES 1, 4 and 5, is rotatably supported in an extends to either side of the right side frame 14 of the machine. The lever 12 is formed with an upwardly and rearwardly extending arm 15 to which one end of a return spring 16 is secured; the other end being secured to an anchor pin 17 on the inner side of the right side frame thereby to return the lever 12 to the normal clutch disengaging position of FIGURE 1. The end of the rearwardly extending arm 15 is bifurcated with the extremities bent off to form offset upper and lower stops 21 and 22 adapted to engage a bent off end 23 of the coil spring 24 of a wrap spring power assist clutch generally designated by reference numeral 25 to thereby maintain the spring expanded and disengaged from, as viewed in FIGURE 2, a driving hub 26 secured to a continuously driven shaft 27; the other end 28 of the spring being secured to a driven element in the form of a circular cam 29 eccentrically mounted for rotation on the driving hub.

As will be understood when the lever 12 is rocked counterclockwise incident to depression of the carriage return key the bent off coil end 23 will slide off stop 21 and wrap about the driving hub 26 coupling the latter to the eccentric cam 29 until the coil end 23 engages a laterally extending arm 31 of a carriage return clutch knock off lever 32 (FIGURES 4—6) at which time, a half revolution being accomplished, the clutch 25 will be disengaged. As viewed in FIGURE 2 the eccentric cam is provided with a slot 33 through which the spring end 23 extends and which

permits sufficient angular movement of the spring whereby it will wrap and unwrap.

The eccentric circular cam 29 is received within a circular hole 34 formed in one end of a forwardly extending lever 35, whereby the initial half revolution movement will move lever 35 forwardly and the final half revolution will move lever 35 rearwardly. The lever 35 is provided with a slot 36 in its other or forward end which receives a pin 37 secured to the upper end of a carriage return clutch actuator release lever 38 which together with a clutch actuator arm 39 is keyed on stub shaft 13; the release lever 38 on the inner end and the actuator arm 39 on the outer end of stub shaft 13. A spring 41 secured to the lower end 42 of the actuator arm 39 and to a frame supported stud 43 biases arm 39, shaft 13, and lever 38 in counterclockwise direction to the extent permitted by the pin and slot connection as viewed in FIGURE 1. Thus when clutch 25 is engaged and lever 35 moves to the left as viewed in FIGURE 1 the clutch actuator arm 39 is committed to effect the engagement of a carriage return clutch hereinafter described.

The clutch actuator arm 39 is provided with a laterally forwardly and upwardly bent extension 44 on whose end is secured a friction or drag shoe 45 adapted to effect engagement of a carriage return clutch generally designated by reference numeral 46 to connect a continuously driven shaft 47 to the carriage return drawband pulley 48. More particularly as shown in FIGURE 3 the carriage return clutch 46 comprises a hub 49 secured to the continuously driven shaft 47 which extends axially towards a pulley hub 51 rotatably mounted on shaft 47. Both hubs are surrounded by a wrap spring 52 having one end 53 secured as by friction to the driven hub and the other end being free; the normal diameter being such that the free end coils are spaced from the pulley hub 51. Accordingly, when the drag shoe 45, which has an arcuate shape complimentary to the spring coils, engages the coils of the free end of the spring 52, the consequent friction slows down the free end coils relative to the fixed end coils causing the spring to wrap and couple hubs 49 and 51. The actuator arm extension 44 also rotatably supports an eccentric roll cam 54 having an arcuate peripheral portion 55 shaped to provide a constant, predetermined time period, sufficient for recovery of the platen indexing mechanism, to elapse between first contact of the roll cam 54 and a friction drive sleeve 56, of rubber or like material, pressed, stretched or molded in place over the end of the wrap spring adjacent the end fixed to the driving hub 49, and engagement of the clutch spring 52 by the friction shoe or drag block 45. The roll cam 54 also is provided with first and second flat peripheral portions 57 and 58 at right angles to one another whereby the roll cam may be detented in the normal inactive position of FIGURE 1 by a leaf spring 59 carried by the actuator arm extension and bearing against flat 57, and after engagement of the arcuate portion 55 of and consequent rotation of the cam 54, to detent the cam 54 in a second inactive clutch engaged position as shown in FIGURE 5 by the spring bearing against the first flat 58.

As viewed in FIGURES 6 and 7 the carriage return drawband 61 is trained about guide pulleys 62 and connected to the carriage frame as at 63; the last pulley 62' in the train being rotatably carried by a line space pawl lever arm 64 rotatably mounted on the platen shaft 65 and biased as by a spring 66 to the position shown in FIGURE 7. As the drawband 61 is wound on pulley 48, the lever arm 64 is rotated counterclockwise and this motion is coupled to a pawl indexing lever 67, also mounted on the platen shaft, by a motion transmitting spring 68 whereby an index pawl 69 carried by lever 67 will engage the line space ratchet (not shown) and rotate the platen. After the platen is indexed a stud 71 on the lever arm 64 encounters an abutment 72 on the carriage frame so that continued pull on the drawband 61 will pull the carriage.

With reference to FIGURE 6 when a margin stop 73 on the margin bar carried by the carriage encounters the

margin locator or knock-off paddle 74, pivotally secured to the center post 75 of the machine, the locator 74 is rocked counterclockwise as viewed in FIGURE 6 and its lower end 76 pulls a link 77 toward the right thereby rocking the carriage return knock-off lever 32 clockwise. This movement releases the end 23 of wrap spring 24 which wraps and couples the eccentric cam 29 to the continuously driven shaft 27. After a second half revolution, the end 23 of the wrap spring will encounter stop 21 or stop 22, the latter if the carriage return key has not been released, causing the clutch spring 24 to disengage. In the latter case when the carriage return key is released the spring end 23 will slip off stop 22 but will be engaged almost immediately thereafter by stop 21 before the spring 24 can wrap.

The movement of the eccentric cam 29 over the second half cycle pulls link lever 35 to the right thereby rocking, via release lever 38 and shaft 13, the carriage return clutch actuator arm 39 clockwise thereby to effect disengagement of the carriage return clutch 46. The clockwise movement of the actuator arm brings the reset flat 58 on the cam 54 into engagement with a reset abutment 78 which resets the cam to its normal FIGURE 1 position.

The time interval between engagement of a margin stop 73 with the locator 74, and disengagement and immediate re-engagement of the carriage return clutch 46, as when a repeat line space is required, being generally shorter than the recovery time of the platen indexing mechanism, requires as hereinbefore stated that an engagement delay be provided to assure recovery before re-engagement. This is accomplished by the roll cam 54 which permits a constant predictable time period to elapse between the first contact of the roll cam 54 and friction cylinder 56 and engagement of the clutch spring 52 by the drag block 45. In addition the dynamics of the actuator arm 39 and drag block 45 are determinable by the shape of the cam 54 so as to accurately control the engagement characteristics of the wrap spring 52 by eliminating actuator arm bounce and by reducing the shock of instantaneous carriage return clutch engagement by permitting a gradual pickup of load by the clutch spring 52.

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 clutch having driving and driven members, operation responsive means movable to effect the coupling of said driving and driven members, and means associated with said driving member and said operation responsive means to control the movement of said operation responsive means comprising, a friction cylinder driven by said driving member, and an eccentric roll cam pivotally mounted on said operation responsive means operative upon movement thereof to encounter said friction cylinder thereby to delay the movement of said operation responsive means.
2. In a clutch having drive and driven members and a coil spring operative when wrapped to couple said drive and driven members, an actuator arm provided with spring engagement means operative to effect wrapping of said spring, a friction cylinder driven with said drive member, and an eccentric roll cam rotatably mounted on said actuator arm adapted to encounter said friction cylinder before said spring engagement means to thereby delay the operation of said spring engagement means.
3. In a wrap spring clutch, a driving element and a driven element, a wrap coil spring driven by said driving element and adapted to wrap about said driven element to couple said driving and driven elements,

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a friction sleeve mounted on said driving element,
 a clutch engagement actuator arm,
 a drag block on said arm adapted upon movement of
 said actuator arm to frictionally engage said spring
 whereby it will wrap,
 and an eccentric roll cam rotatably mounted on said
 actuator arm adapted to engage said friction sleeve
 and to be driven thereby whereby the engagement
 of the drag block with said spring is delayed a pre-
 determined time.

4. In a typewriter having a carriage and a platen rotat-
 ably mounted thereon,
 platen indexing mechanism operable through a working
 interval incident to powered carriage movement and
 through a recovery interval after termination of pow-
 ered carriage movement,
 a rotatable drum,
 a carriage return drawband connected to said drum and
 to said platen indexing mechanism, power means,
 a carriage return clutch engageable in response to de-
 pression of a drum return key for coupling said pow-
 er means to said carriage thereby in turn operating
 said platen indexing mechanism through its working
 interval and returning said carriage, and disengage-
 able in response to movement of a margin locator by
 said carriage, the interval between disengagement and
 re-engagement of said clutch incident to repeat oper-
 ation of said carriage return key being less than the re-
 covery interval of said platen indexing mechanism,
 means movable to effect clutch engagement in response
 to carriage return key depression,
 and control cam means operative in response to and for
 predeterminedly controlling the movement of said last
 named means to thereby delay clutch engagement
 over an interval greater than the recovery interval
 of said platen indexing mechanism.
 5. In a typewriter having a carriage and a platen rotat-
 ably mounted thereon,
 platen indexing mechanism.
 a rotatable drum,

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a carriage return drawband connected to said drum
 and to said platen indexing mechanism, power means,
 a clutch for coupling said power means to said drum
 thereby in turn to operate said indexing mechanism
 and to return said carriage,
 clutch actuator means,

means responsive to depression of a carriage return key
 to effect the movement of said clutch actuator means
 to effect clutch engagement and responsive to ter-
 minal movement of said carriage against a margin
 locator for moving said clutch actuator means to
 effect clutch disengagement, the improvement com-
 prising a friction cylinder driven by the driving ele-
 ment of said clutch and an eccentric roll cam on said
 clutch actuator means adapted upon movement of
 said clutch actuator means to effect clutch engage-
 ment to encounter said friction cylinder to thereby
 delay the movement of said clutch actuator means
 whereby clutch engagement is delayed over an in-
 terval greater than the recovery interval of said
 platen indexing mechanism.

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