

May 5, 1959

J. T. DAVIDSON
STRIP FEEDING MECHANISM

2,885,053

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2 Sheets-Sheet 1

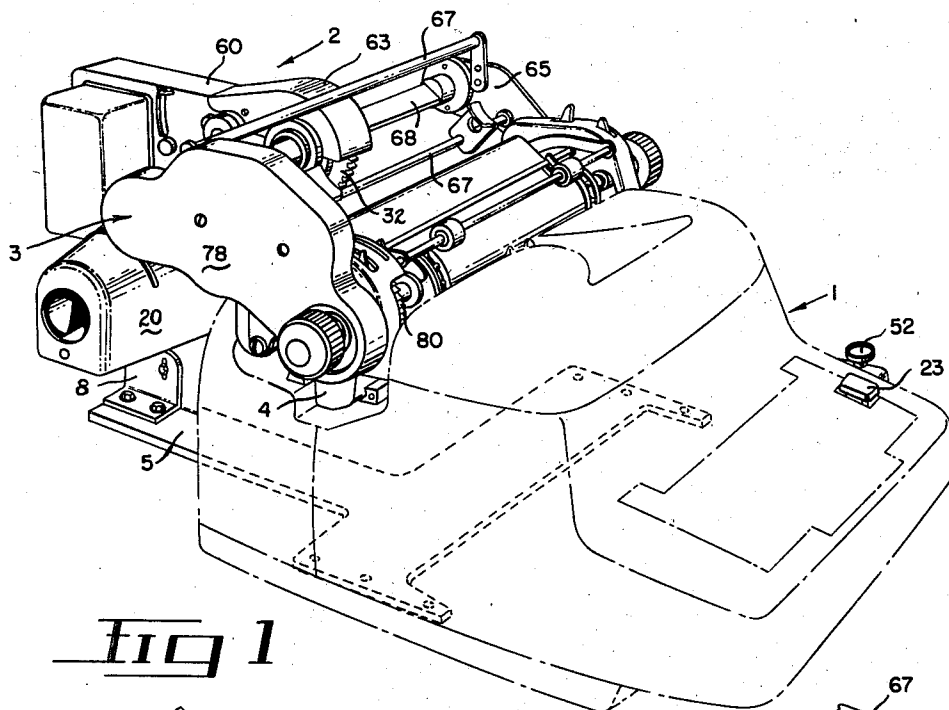


Fig 1

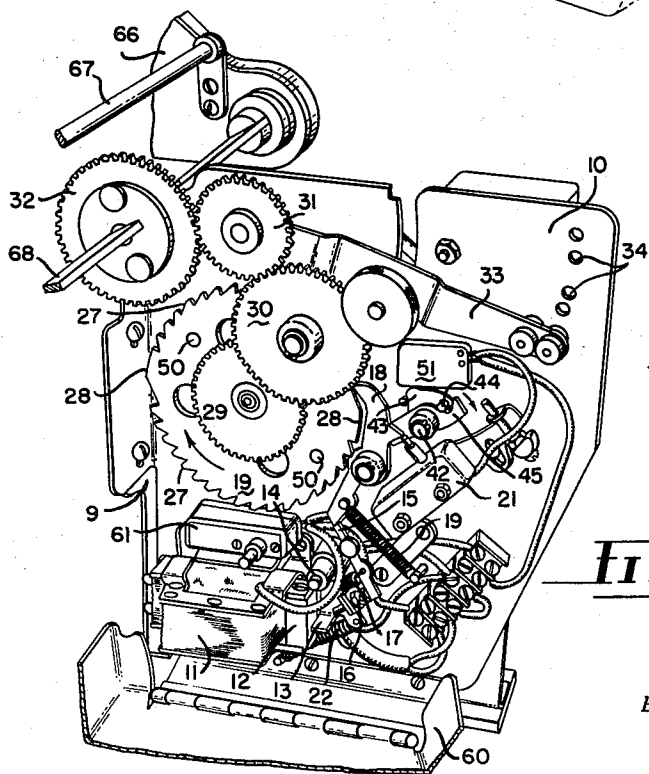


Fig 3

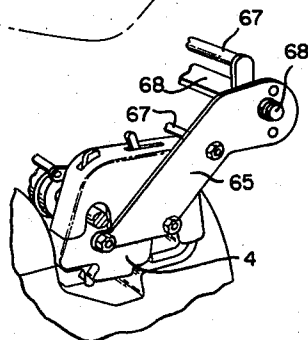


Fig 4

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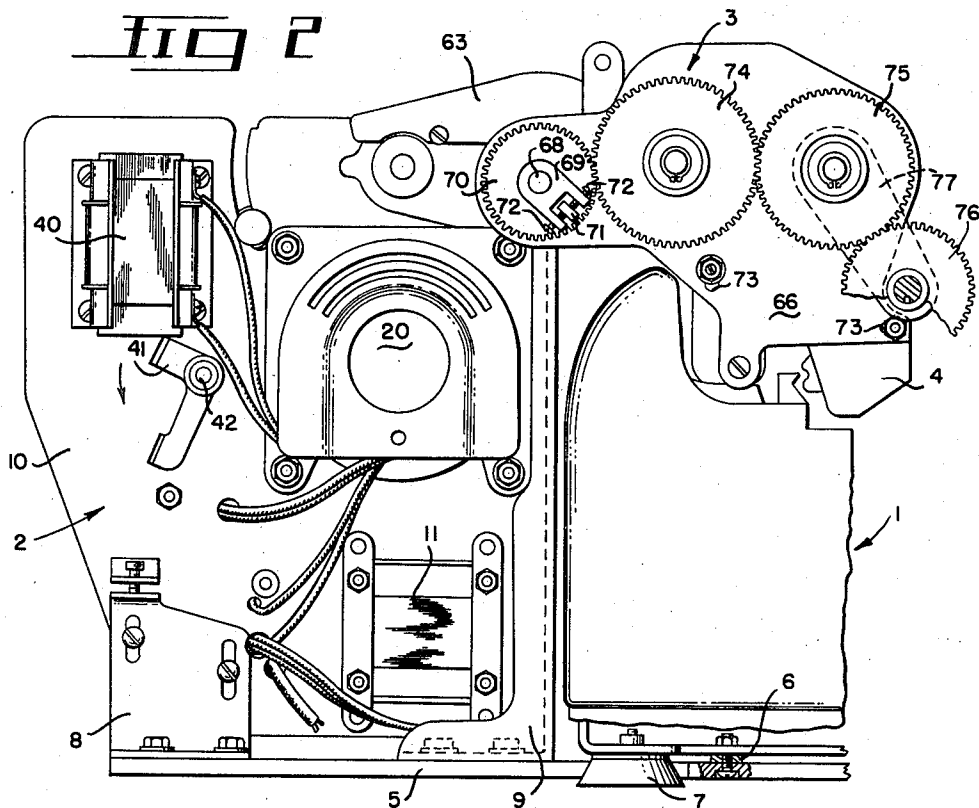
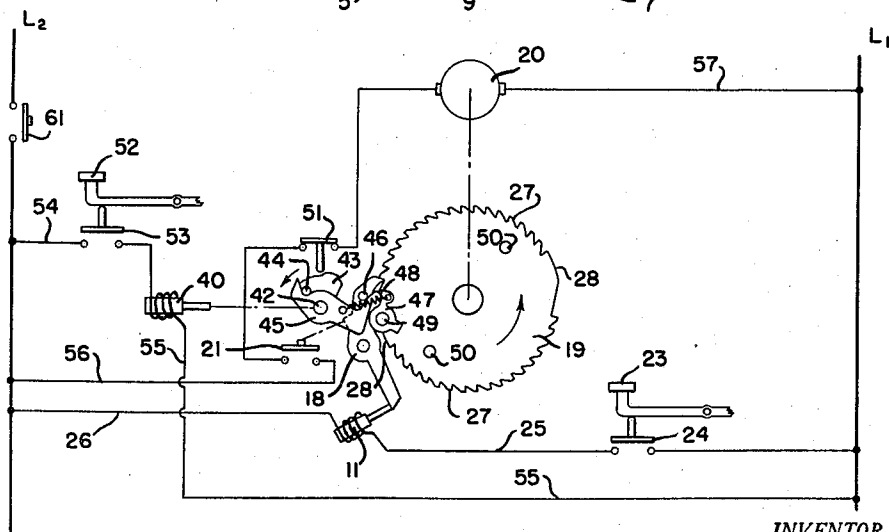
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STRIP FEEDING MECHANISM

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Application April 29, 1954, Serial No. 426,458

9 Claims. (Cl. 197—133)

This invention relates to strip feeding mechanisms, and more particularly to electrically operated line finder or eject mechanisms. Such line finders or eject mechanisms are utilized primarily in continuous form operations and serve to automatically eject the record strip from the last line inscribed upon one form to the first writing line of the succeeding form regardless of where the last inscribed line might be located in relation to the form area. Such eject mechanisms are not, per se, new but all such mechanisms which have heretofore been commercially used have certain disadvantages. Among such disadvantages has been the necessity for the operator to remove her hand from the writing machine keyboard, reach to the top of the machine and grasp a lever, then pull the lever against a stop resulting in the rapid advancement of the strip to the first writing line of the succeeding form.

With the present mechanism it is unnecessary for the operator to remove her hand from the keyboard of the writing machine in order to eject or rapidly advance the record strip to the next succeeding form. A control button for the mechanism is conveniently located adjacent to keyboard of the writing machine which enables the operator's hands to remain in productive position on the keyboard thereby reducing the time involved and increasing the output of the machine. By controlling operation of the eject mechanism from adjacent the keyboard of the writing machine the possibility of errors is also greatly reduced.

Thus, the object of the invention is to simplify the construction as well as the means and mode of operation of strip feeding mechanisms, whereby such mechanisms may not only be economically manufactured, but will be more efficient and satisfactory in use, adaptable to a wide range of applications, and be unlikely to get out of repair.

A further object of the invention is to provide in a mechanism of the type described, means for energizing the strip feeding mechanism independently of operation of the writing machine carriage.

A further object of the invention is to consolidate the normal line spacing mechanism of the writing machine into the mechanism comprising the rapid eject feed, thereby eliminating two separate feeding mechanisms in the writing machine.

A further object of the invention is to provide dual means within or adjacent the keyboard area of the writing machine whereby the mechanism may be actuated for either the normal line-for-line spacing or the rapid eject of the record strip.

A further object of the invention is to provide separate power means for the strip feeding mechanism whether it be operated in a normal line-to-line manner or in the rapid eject of the record strip.

A further object of the invention is to provide in such a device a permanent stationary mounting for the actuating means for the line spacing mechanism.

A further object of the invention is to provide a

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unit which may be easily mounted upon a conventional writing machine, such as a typewriter for example.

A further object of the invention is to provide by such a mounting a means for removing from the carriage the bulk and weight of the actuating means for the strip feeding mechanism.

A further object of the invention is to provide a strip feeding mechanism possessing the advantageous structural features, the inherent meritorious characteristics and the features of construction herein set forth.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the drawings, wherein is shown one but obviously not necessarily the only form of the invention,

Fig. 1 is a perspective view of the strip feeding means attached to a typewriter,

Fig. 2 is a side view of the strip feeding mechanism with the covers removed, showing a portion of the typewriter and its carriage,

Fig. 3 is a perspective view of the actuating mechanism looking from the opposite side of that shown in Fig. 1,

Fig. 4 is a fragmentary view showing the right hand end of the carriage from the opposite side of that shown in Fig. 1, and

Fig. 5 is a schematic wiring diagram of the mechanism.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawings, there is shown in Fig. 1 a conventional electric typewriter generally designated 1, to which the strip feeding mechanism comprising the subject matter of the present application is attached. Such strip feeding mechanism consists of two parts, first the actuating means generally designated at 2, and second the motion transmitting means generally designated 3, by means of which motion is transmitted from the actuating mechanism 2 to the typewriter carriage 4 and the platen carried thereby.

The actuating mechanism 2 is fixedly supported upon a T-shaped bracket 5 which is fixedly secured to the under side of the typewriter 1. The bracket 5 is attached to the under side of the typewriter in such position that it will, when the typewriter is supported upon a table or other surface, rest flat on said supporting surface. Such mounting of the bracket 5 is achieved by means of spacers 6 intermediate the typewriter frame and the bracket. The bracket is positioned relative to the under side of the typewriter so that as the typewriter compresses the rubber feet 7 the typewriter and the brackets will be firmly positioned upon the supporting surface.

Projecting upwardly from the rear of the mounting bracket 5 are a pair of brackets 8 and 9 which support the mounting plate 10 for the actuating mechanism. The plate is capable of limited vertical adjustment relative to the brackets 8 and 9 so as to bring the actuating mechanism into proper relationship with the carriage of the typewriter.

The actuating mechanism 2, which is mounted upon plate 10, is quite similar to that shown and claimed in application for United States Letters Patent of Percy G. Stimpson and John T. Davidson, Serial No. 83,196, filed March 24, 1949, now U.S. Patent No. 2,806,692. The actuating mechanism of the prior co-pending application has, however, been adapted for operation in connection with a typewriter or similar type of writing machine wherein the feeding device actuated thereby moves transversely of the actuating mechanism, which mechanism re-

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mains stationary with respect to the transversely movable strip feeding device.

For line-by-line spacing, the actuating mechanism is set in motion upon energization of solenoid 11. This causes its armature 12 to move outwardly (towards the right of Fig. 3) into engagement with a pawl tripping assembly 13, oscillating such assembly in a counterclockwise direction about its pivot point or supporting stud 14. The pawl 13 is in the form of a "bell crank" lever, the upper arm having pivotally mounted thereon a pusher member 15. The member 15 is adjustably positioned about its pivot by the adjustable support 16 against which the member 15 is maintained under influence of a retractile spring 17.

Upon movement of the pawl assembly 13 in a counterclockwise direction, the tip or nose of member 15 engages the tail portion of the spacing disc pawl 18, oscillating such pawl in a clockwise direction about its mounting stud. The nose of the member 15 and the cooperating tail portion of the pawl 18 are so shaped that the member 15 clears the pawl 18 after initial engagement, thereby leaving the pawl 18 free for return to its normal position under influence of retractile spring 19.

Fig. 3 shows the parts partially operated, i.e., the member 15 is just about to clear the tail of pawl 18, which clearance occurs simultaneously with the withdrawal of the upper arm of the pawl 18 from a notch in the disc 19. Prior to full withdrawal of pawl 18 from the disc 19 under influence of the tripping assembly 13, motor 20 is energized by engagement of a projection on pawl 18 with a plunger on switch 21. Motor 20 is connected to disc 19 by means of a friction clutch so that as soon as disc 19 is released by the pawl it begins to rotate under influence of the previously energized motor 20.

Immediately following actuation of switch 21 and withdrawal of pawl 18 from disc 19 the tripping assembly 13 and its member 15 passes the tail of pawl 18 thereby freeing pawl 18 for return into engagement with periphery of the disc 19 under influence of retractile spring 19. Such return movement of pawl 18 deenergizes motor 20 and also brings the pawl into position for engagement in the next succeeding notch of the disc 19 thereby arresting its rotation. Energization of solenoid 11 which starts this operation, is of a momentary nature and upon deenergization thereof the armature 12 returns to its normal position thereby permitting the tripping assembly 13 to return to its normal position under influence of retractile spring 22. The unit is then ready for the next succeeding operation.

Turning to Fig. 5, energization of solenoid 11 is controlled by the carriage return key 23 which is a normal key on the typewriter keyboard. The normal or conventional typewriter construction is, however, slightly modified by the addition of switch 24 immediately beneath the carriage return key 23 in such position that the carriage return key when depressed will close the switch 24 thereby completing the circuit from a power supply line L¹ and L² through conductors 25 and 26 to the solenoid 11.

Returning to Fig. 3, motion of the disc 19 is regulated to predetermined increments by the spacing between succeeding notches in the periphery thereof. As shown, there is one group of notches 27 which represents successive line-by-line spacing increments. A second notch 28, which is longer than the notches 27, represents a skip feed so as to advance from the end of one form to the first writing line of the next form. Thus, the heading on the form is automatically skipped. The particular unit shown has, on the disc 19, a pair of notches 28 and two groups of notches 27. Thus, one complete revolution of the disc 19 represents the passage of two form lengths through the machine.

Mounted concentrically with disc 19 and secured thereto for unison rotation is a gear 29 which meshes with and drives a gear immediately behind and concentrically affixed to gear 30. Motion of gear 30 is transmitted

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through idler gear 31 to the final output gear 32 of the actuating mechanism. Gear 30 and its associated gear on the rear thereof are mounted upon an oscillatory arm 33 which may be adjusted to different positions represented by the perforations 34 in the plate 10. When so adjusted the gear 29 may be interchanged for similar gears of different size so as to alter the amount of feed imparted to the output gear 32 during each operation of the actuating mechanism. The arm 33 is also swung into upward position to enable removal of the disc 19 for interchange with other discs of similar design but having a different spacing of the notches about the periphery. This change provides a different "program" for operation of the actuating mechanism.

The mechanism so far described provides for the normal line spacing operation of the platen in the writing machine and is actuated by normal operation of the carriage return key 23 on the keyboard of the writing machine. Although, the normal line spacing mechanism is actuated simultaneously with the carriage return, it should be noted that the strip feeding mechanism and the actuating mechanism therefor is energized entirely independently of, and operates independently of, the carriage return mechanism and the power source embodied within the typewriter 1. The only part common to the two portions of the machine is the actuating key 23 which not only closes the switch 24 to energize the actuating mechanism but performs its normal function of energizing the carriage return mechanism comprising a part of the typewriter itself.

Turning now to the eject portion of the actuating mechanism, this is actuated by energization of the solenoid 40. This causes lever 41 (Fig. 2) and its mounting shaft 42 to rotate in a counterclockwise direction. Referring to Fig. 3 the shaft 42 rotates in a clockwise direction and fixed thereto is a segment 43. Upon clockwise rotation of segment 43, stud 44 carried thereby engages one end of an oscillatory lever 45 freely mounted upon shaft 42. The opposite end of lever 45 has a surface thereon which upon oscillation engages a stud 46 carried on the back side of pawl 18. This structure is shown in Fig. 5 in which motion of shaft 42 under influence of the solenoid 40 is again in a counterclockwise direction similar to Fig. 2. Engagement of lever 45 with the stud 46 causes the pawl 18 to move in a counterclockwise direction (Fig. 5) to thereby close switch 21 to energize the motor as previously described.

Upon oscillation of lever 45 under influence of solenoid 40, the lever is held in operated position by the pivoted catch member 47. Catch member 47, normally biased into locking engagement with lever 45 by means of retractile spring 48, is mounted upon pivot stud 49 for oscillatory motion into and out of latching engagement beneath a shoulder on the lever 45. The opposite end of the catch 47 projects into the path of the stud 50 carried by the disc 19. The position of the stud 50 upon the disc 19 is determined in relation to the location of the notches 28 thereon as indicating the first writing line of a succeeding form. Just prior to the time the pawl 18 would engage the notch 28, the stud 50 engages the tail of catch lever 47 and rocks it out of engagement with the lever 45, whereupon lever 45 falls in a clockwise direction (Fig. 5) releasing pawl 18 so that it may engage the notch 28 in the disc arresting the actuating means with the first writing line of the form in recording position.

Oscillation of the segment 43 (counterclockwise Fig. 5 and clockwise Fig. 3) opens switch 51 simultaneously with its cocking of the lever 45 into pawl engaging position. Switch 51 and the means for opening it are provided so as to insure that the mechanism is properly set prior to energization of the motor 20, which of course takes place upon movement of pawl 18 in a counterclockwise direction (Fig. 5) under influence of the lever 45 and its motion about its pivot. Energization of the

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solenoid 40 and the oscillation of segment 43 is of momentary duration, being under direct control of button 52 mounted outside of the typewriter frame. Also, mounted on the typewriter frame, so as to be actuated by button 52 is a switch 53 (Fig. 5) which when closed completes the circuit from the power supply line L² through the solenoid 40 to power line L¹ by means of conductors 54 and 55. Button 52 may be so designed that it will, simultaneously with the closing of switch 53, trip the carriage return mechanism of the typewriter itself. Thus, depression of button 52 causes the simultaneous operation of the strip feeding mechanism to rapidly advance or eject the strip from the last inscribed line on one form to the first writing line of the succeeding form and at the same time causes the carriage to return to the left hand margin.

During the interval that switch 53 is closed, as previously explained, switch 51 in the motor circuit is open. Thus, movement of the pawl 18, so as to close switch 21 in the motor circuit, is ineffective to energize the motor. Upon release of button 52 and the opening of switch 53, switch 51 thereon closes completing the motor circuit from power line L² through conductor 56, switch 21, switch 51 and conductor 57 to power line L¹.

Thus, actuating mechanism 2 provides two different kinds of feeding impulse depending upon whether button 23 or button 52 is depressed by the operator. Depression of button 23 causes the carriage to return to the left hand margin and also advances the actuating mechanism through increments of one line space at a time. Depression of button 52 causes the actuating mechanism to advance through an extended interval, moving from the last inscribed line of one form to the first writing line of the succeeding forms and may simultaneously therewith cause the carriage to return to the left hand margin.

The actuating mechanism is enclosed within appropriate cover members. Pivotaly mounted upon one side of the mounting plate 10 is a cover 60 which when in closed position closes the cover actuated safety switch 61. Referring to Fig. 5 this cover actuated switch 61 is in the power line L², and when opened deenergizes the entire mechanism. The output gear 32 of the actuating mechanism is also enclosed in an appropriate cover 63 which is mounted upon the supporting plate 10. Not only does the cover 63 provide an enclosure for the upper portion of the actuating mechanism but it also provides a mounting for output gear 32 holding the gear against lateral movements.

Mounted upon the carriage of the typewriter by means of side plates 65 and 66 is motion transmitting means which transmits the rotary motion of the output gear 32 to the platen roll of the writing machine. Interconnecting the side plates 65 and 66 are a pair of tie rods 67 and a rotary shaft 68 suitably journaled in the side frames. While the ends of the shaft 68 are circular the central portion thereof is flat to provide a structure much like a spline. This permits transverse sliding movement of shaft 68 back and forth through output gear 32 of the actuating mechanism while insuring positive rotary motion of the shaft 68 in unison with and to the same extent as the output gear 32.

On the outboard end of the shaft 68 adjacent side plate 66 is mounted a drive element 69 which element is secured to the shaft for unison rotation therewith. Freely mounted upon the shaft 68 and in adjacent relation to the drive element 69 is a gear 70 which has fixed to one lateral face thereof a projection or lug 71. Gear 70 is adjustably connected to the driving element 69 for unison rotation therewith by means of the screws 72 which extend through the drive element 69 into engagement with opposite sides of the lug 71. By adjustment of the screws 72 the relative angular position of the gear 70 may be adjusted relative to the drive element 69.

Elongated slots 73, in side plate 66, permit limited adjustments of the side plate relative to the writing ma-

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chine carriage 4. Mounted upon side plate 66 are a plurality of idler gears 74 and 75 which transmit rotary motion of gear 70 to final gear 76 which is secured to the platen shaft of the writing machine for unison rotation therewith. Gear 76 is also mounted upon a swinging arm 77 which pivots about the stub shaft mounting the gear 75. In this way the gear 76 may be brought into proper alignment with the platen shaft of the writing machine for mounting thereon without, in any way, disturbing the gear train. A housing 78 is placed over the gear transmission unit carried by the writing machine carriage so as to enclose the same.

With this construction rotary motion of the output gear 32 of the actuating unit is transferred to the platen roll of the writing machine through shaft 68, driving lug 69, gears 70, 74, 75, and 76. This is true whether the rotary motion of output gear 32 results from depression of key 23 for normal line-by-line spacing operation or from depression of key 52 which actuates the eject cycle of operation of the actuating means. Rotary motion of the output gear 32 is likewise transmitted to the platen roll of the writing machine regardless of the lateral displacement of the platen roll and carriage relative to the location of the actuating mechanism and its output gear 32. Similarly the motion of output gear 32 is transmitted to the platen roll during lateral motion of the carriage and the platen transversely of the actuating mechanism and its output gear due to the sliding connection provided between shafts 68 and output gear 32. Thus, the actuating mechanism is effective to advance the platen roll in step-by-step operation or in a single step of greater extent depending upon which of the two control keys 23 or 52 is depressed regardless of the position of the writing machine carriage relative to the actuating means. The actuating mechanism is also operative to impart the desired rotation to the platen roll even during lateral movement of the carriage relative to the actuating mechanism.

The line spacing mechanism normally provided in the writing machine 1, which actuates the platen roll through the ratchet wheel 80 (Fig. 1) is deactivated in this installation. The pawl normally engageable with the ratchet wheel 80 is removed prior to installation of the present strip feeding mechanism. The removal of this pawl in no way, however, interferes with or alters the operation of the carriage return mechanism provided in the writing machine. As noted the carriage return mechanism is utilized in connection with the operation of the present strip feeding mechanism.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In a writing machine having a transversely movable rotary platen roll, transmission means for driving said rotary platen roll through different increments of motion, including an actuating means therefor capable of selectively operating said roll through any one of a plurality of operating cycles of different extent, a portion of said cycles of operation being of predetermined extent, a further portion thereof being of predetermined extent

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different from the first, and a further portion thereof being of undetermined extent, a plurality of control means for said actuating means, each having means for transversely moving said platen roll operatively connected therewith, said control means being selectively actuated by an operator to simultaneously energize said actuating means through the selected cycle of operation and effect transverse movement of said platen roll.

2. In a writing machine having a transversely movable rotary platen roll, means for operating said rotary platen roll through different increments of motion, including an actuating means therefor capable of operation through any one of a plurality of operating cycles of different extent, a portion of said cycles of operation being of predetermined extent, a further portion thereof being of predetermined extent different from the first, and a further portion thereof being of undetermined extent, a plurality of control means therefor, each having means operatively connected for moving said platen roll in a transverse sense on energization thereof and selectively actuated by an operator to energize said actuating means through the selected cycle of operation, and means for transmitting motion of the actuating means through the selected cycle of operation to the transversely movable platen roll simultaneously with the transverse adjustment of the platen roll relative to the writing machine and actuating means.

3. In a typewriting or like machine having a key board area and operable on preprinted series connected record forms, a rotatable platen roll; drive means for rotating said platen roll including selective means for initiating and interrupting the rotation of said platen roll through said drive means in step by step fashion to establish the writing lines of one record form successively in writing position or the first writing line of the next succeeding record form in writing position, one of said selective means including interrupter means preventing initiation of rotation of said platen roll for a predetermined interval and delaying interruption of said rotation until one record form is ejected and a succeeding one is advanced to present its first line in writing position.

4. In a typewriting or like machine having a key board area and operable on preprinted series connected record forms, a rotatable platen roll; means for rotating said platen roll in step by step fashion to bring the writing lines of one record form successively to writing position and to bring the first writing line of the next succeeding record form to writing position, said means including a line finder mechanism for releasing said platen roll for rotation and for arresting such rotation; and two operator controlled keys in said key board area, both of said keys acting on said line finder mechanism to release said platen roll for turning and one of said keys further acting to interpose a time delay in the arrestment of said platen roll by said line finder mechanism.

5. In an electric typewriting or like machine, a relatively stationary frame; a laterally movable carriage supported by said frame; a rotatable platen roll carried by said carriage; an electric motor on said frame providing a source of power for rotation of said platen roll; a gear train extending to said platen roll for rotation thereof, including a spline connection affording simultaneous rotation of said platen roll and lateral shift of said carriage; a line finder mechanism between said motor and said gear train for obtaining different extents of rotation of said platen roll; and a plurality of keys for controlling said line finder mechanism, one of said keys being the carriage return key of the typewriter.

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6. In an electric typewriting or like machine operable on preprinted series connected record forms, a relatively stationary frame; a laterally movable carriage supported by said frame; a rotatable platen roll carried by said carriage; an electric motor on said frame providing a source of power for rotation of said platen roll; motion transmitting means between said motor and said platen roll including a spline connection affording simultaneous rotation of said platen roll and lateral movement of said carriage, said motion transmitting means further including line finder mechanism operating in a first sense to limit said platen roll to successive increments of motion corresponding to successive writing lines on a record form and operating in a second sense to enable the platen roll to advance from the last inscribed line of one record form to the first writing line of the next succeeding form substantially uninterruptedly; and separate keys on the typewriter for operating said line finder mechanism in said separate senses, one of said keys being the carriage return key of the typewriter.

7. An electric typewriting machine according to claim 6, characterized in that said one key operates said line finder mechanism in said first sense.

8. In a writing machine operable on preprinted series connected record forms having a reciprocable carriage and a rotatable platen mounted thereon and a keyboard, a first carriage return key, a second carriage return key, said keys having carriage return means connected therewith and to the machine carriage for selective operation for carriage return, switch means operatively associated with each of said keys, one of said switch means having operating means connected for step by step rotation of said platen roll to advance a record form a space corresponding to a single writing line and the other of said switch means having means connected for rotating said roll an interval sufficient to effect an advance of the record form from the machine to align the first writing line of the succeeding form for imprint, the selective depression of one of said keys simultaneously being operable to effect carriage return and operation of one of said switch means.

9. In a writing machine operable on preprinted series connected record forms having a reciprocable carriage and a rotatable platen mounted thereon, means for reciprocating said carriage, means operatively related to said means for reciprocating said carriage providing actuating means for said platen, a single output member for said actuating means having driving engagement with said rotatable platen, said means for reciprocating said carriage being operable to simultaneously reciprocate said carriage and energize said actuating means to effect simultaneous rotation of said platen and means operatively connecting said actuating means and said output member including interrupter means for respectively interrupting the movement of said platen at constant intervals or interposing a delay in the interruption thereof simultaneously with the reciprocation of said carriage.

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