

March 3, 1959

G. T. MILES

2,875,883

AUTOMATIC LINE SELECTOR

Filed Dec. 29, 1954

2 Sheets-Sheet 1

FIG. 1

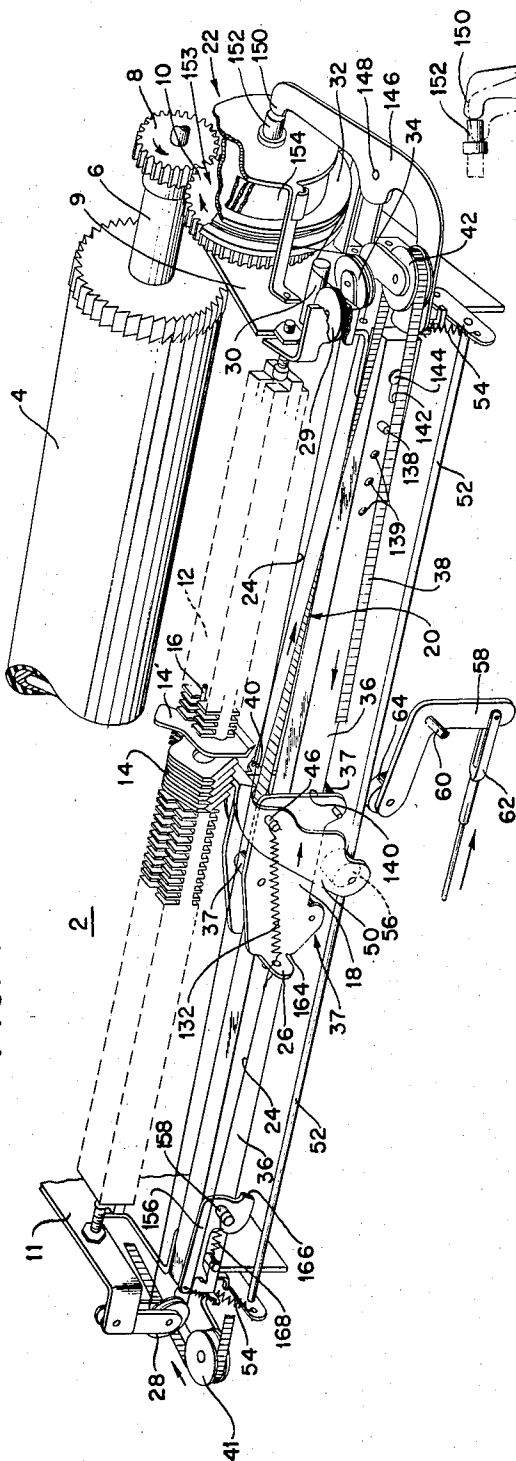


FIG. 2

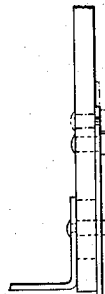
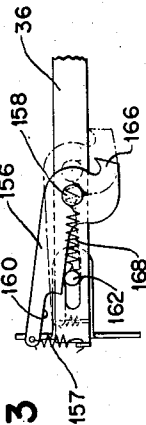


FIG. 3



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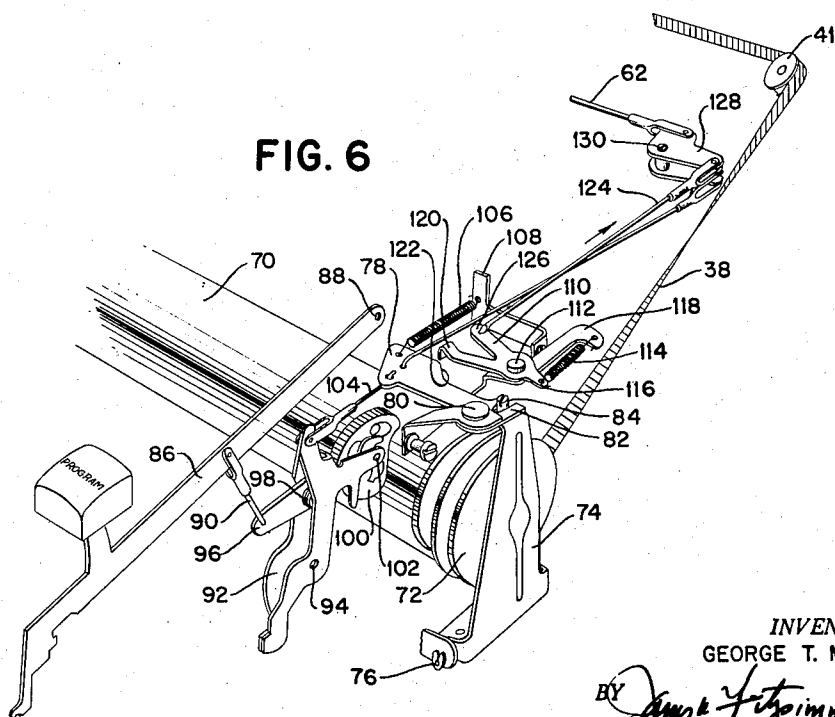
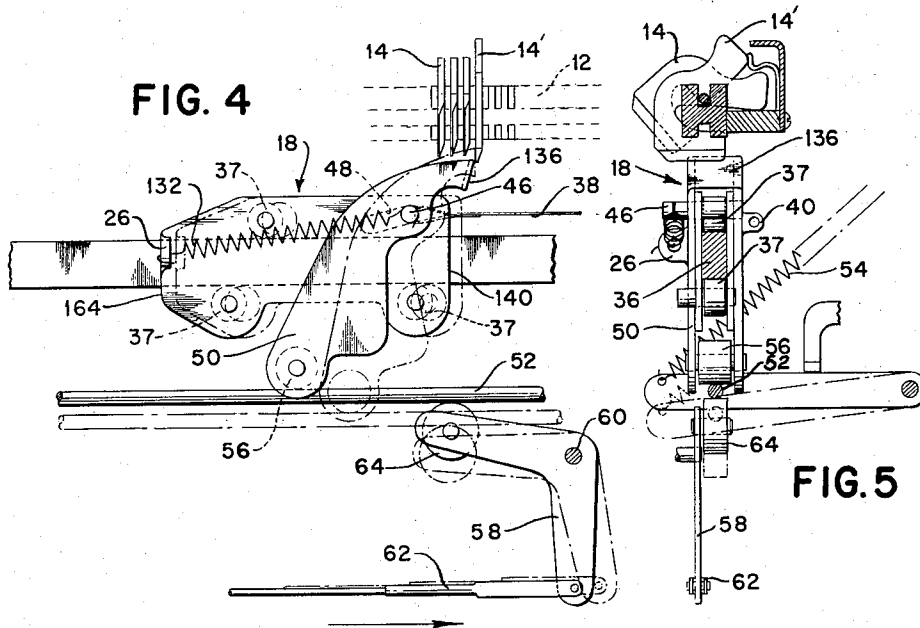
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2 Sheets-Sheet 2



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AUTOMATIC LINE SELECTOR

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Application December 29, 1954, Serial No. 478,290

6 Claims. (Cl. 197—133)

This invention relates to typewriters and more particularly to an automatic programming device for advancing a form with the typewriter platen sequentially to preselected lines for printing.

In some typewriter installations, for example, where insurance application forms are filled out, typing is always performed on predetermined lines of each form. In such a case, it is obviously advantageous to provide an automatic programming device which will advance the form to the predetermined lines for typing without the operator having to make manual adjustments.

It is a first object of this invention to provide an improved automatic programming device.

It is a further object of this invention to provide an improved automatic programming device wherein the program for any form can be changed at will.

It is a still further object of this invention to provide an improved automatic programming device having a selector which is returned automatically to its home or starting position, upon the completion of any one form.

It is a further object of this invention to provide an automatic programming device which is operable with forms of varying lengths.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a perspective view of some of the operating components of the automatic programming device.

Fig. 2 is a plan view of a clutch release mechanism.

Fig. 3 is a rear elevation of the clutch release mechanism shown in Fig. 2.

Fig. 4 is a rear elevation of a power cut off device shown in Fig. 1.

Fig. 5 is an end view of the automatic cut off device shown in Fig. 4; while

Fig. 6 is a perspective view of carriage return mechanism.

Briefly, this invention relates to a mechanism comprising a program bar having a plurality of parallel stops which are movable to an active or inactive position, a selector mechanism mounted for sliding movement relative to the program bar, and a pulley system operable to rotate the platen in response to movement of the selector relative to the program bar. The selector is moved by a tension tape mechanism to advance the selector stop by stop along the program bar thereby advancing the platen to a preselected line as determined by the stop settings.

Referring to the drawings, and more particularly to Fig. 1, a typewriter carriage 2 is shown provided with a platen 4 mounted for rotation with a shaft 6 which is supported in the conventional manner in the carriage end plates (not shown). A pinion 8 is attached to shaft

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6 to be rotated therewith for driving the platen 4. More specifically, the counterclockwise rotation of the pinion 8 advances the platen 4 thereby positioning a form on the printing line. The pinion 8, in turn, is meshed with and rotated as a result of the clockwise rotation of a driving gear 10 which is rotatably supported by the carriage end plate 9.

A program bar 12 is mounted on the carriage with its axis parallel to that of the platen, and it has its ends supported in the carriage end plates 9, 11. The program bar 12 is of conventional form having a plurality of stops 14 pivotally supported about the axis 16 of the program bar for movement from an inoperative to an operative position. The stop 14' is shown in the operative position, while the stops 14 are in the inoperative position. Ideally, there is one stop 14 on the program bar for each printing line of a form, the intention being to move a stop to its active position (as shown by a stop 14') for each line of the form which is to be set at printing position.

A platen driving mechanism is provided for rotating the platen a predetermined amount under the control of the stops 14'. The driving mechanism comprises a selector 18, a tension tape system 20 and a pulley system 22. A wire 24 is attached to an ear 26 on the selector 18 and is carried around guide pulleys 28, 29 and over a guide 30 to a drive pulley 32 in the pulley system 22. The wire is then wrapped around the pulley 32 a number of times and then carried about the pulley 34 to an ear 40 on the selector 18. The selector 18, in turn, is mounted for free movement relative to a selector bar 36 by a plurality of roller bearings 37. With this structure, the movement of the selector 18 along the selector bar 36 to the right, as viewed in Fig. 1, exerts tension on the wire 24 to rotate the pulley 32 clockwise as viewed in Fig. 1. The pulley 32 is connected through a clutch system to the driving gear 10 whereby any clockwise rotation of the pulley 32 will produce a counterclockwise rotation of the pinion 8 thereby advancing the platen, and consequently, a form carried thereby.

Selector driving mechanism

In order to advance the selector to the right as viewed in Fig. 1, across the selector bar 36, any power driven tape, such as the carriage return tape 38 shown, is carried around pulleys 41, 42 and attached to a pin 46 carried by the selector 18. The pin 46, as viewed in Fig. 4, is arranged to slide up in an inclined slot 48 from an inactive to an active position (the active position is shown in Fig. 4). The pin, in turn, carries a selector arm 50 in such a manner, that as the pin 46 is moved to its active position (shown in Fig. 4), the selector arm 50 is raised to the stop engaging position which is shown in solid lines. In this position, any pull on the tape 38 will advance the selector arm 50 to its active position where it can engage one of the stops 14 set in the active position. Once the selector arm 50 has reached a stop 14', then any further pull on the tape 38 will rock the selector arm 50 counterclockwise to dash-dot line position shown in Fig. 4, which will hereinafter be known as the cut off position.

In moving from its active to its cut off position, the selector arm 50 will depress a bail 52 which is pivotally supported in the carriage end frames 9, 11 as shown in Fig. 1, and spring biased by the springs 54 to the upper position in engagement with a roller 56, carried by the selector arm 50. As the bail 52 is depressed, from its solid line to its dash-dot line position of Fig. 4, it will pivot a bell crank 58 clockwise about a pivot pin 60 which is carried by the typewriter frame. This counterclockwise rotation of the bell crank 58 will exert a force

on the link 62 in the direction of the arrow of Fig. 4 for a purpose which will hereinafter be described. The bell crank 58 carries a roller 64 which is engaged (when the carriage return clutch is latched up) with a portion of the bail 52—depending on the transverse position of the carriage.

With regard to the inter-engagement of the selector arm 50 and the stops 14', reference is made to Fig. 5, wherein it will be noted that only when a stop has been moved from its inactive position, as indicated by the stop 14, to its active position 14', can it be engaged by the selector arm 50. Fig. 5 also shows the displacement of bail 52 when it is pivoted from its solid line position wherein it is in engagement with a roller 64 carried by the typewriter frame, to its dash-dot or active position wherein it has rocked the bell crank 58 counterclockwise about its supporting stud 60.

In Fig. 6, the well known carriage return mechanism for an IBM electric typewriter is shown. This mechanism is more completely described in co-pending U. S. patent application Serial No. 469,915, filed November 19, 1954 by Bernard W. Wittwer and accordingly, it is felt that a brief description will suffice to explain its operating principles.

In the well known IBM typewriter, a power roll 70 is rotatably supported for continual operation in response to the rotation of an electric motor. A pulley 72 carrying tape 38 is normally disengaged from the continually rotating power roll 70. However, when the arm 74, which is pivotally supported about a pin 76, is rocked counterclockwise about the pin 76 into end engagement with the power roll 70, a driving relationship between the power roll and the pulley 72 is established to exert a tension on the tape 38 thereby winding the tape on the pulley 72.

In order to rock the arm 74 counterclockwise, a bell crank 78 is pivotally supported on a pin 80 carried by the typewriter frame. The bell crank 78 has an arm 82 which is bifurcated to receive a pin 84 carried by the outer end of the arm 74. As the bell crank 78 is rocked counterclockwise about its supporting pin 80, the bifurcated end 82 acts on pin 84 to pivot the arm 74 counterclockwise about its supporting pin 76 thereby establishing a driving relationship between the power roll 70 and the pulley 72.

A carriage return key lever 86 is pivotally supported about one end 88 in the conventional manner and is connected by a link 90 to a carriage return power cam unit 92, which in turn, is pivotally supported about some pivot point 94. The power cam unit 92 has an actuating arm 96 which, when rocked counterclockwise about a pivot point 98 (as would be caused by depressing the carriage return key lever 86), brings a cam 100 into engagement with the power roll 70 for a flip cycle wherein the gradually increasing radius of the cam 100 acts on its supporting point 102 to rock the carriage return cam unit 92 counterclockwise about its pivot 94 thereby exerting a pull on link 104 which will rock the bell crank 78 counterclockwise about the pivot point 80 thereby engaging the pulley 72 with the power roll 70 to exert a pull on the tension tape 38.

The bell crank 78 is biased normally to its clockwise limit by a spring 106 which interconnects the bell crank 78 and a portion of the typewriter frame 108.

A lock 110 is pivotally supported about a pin 112 carried by the typewriter frame and it is spring biased in the counterclockwise direction by a spring 114 which interconnects crank arm 116 with an extension 118 of the typewriter frame. With this structure, it is obvious that, as the bell crank 78 is rocked counterclockwise, the spring 114 acts to rock the lock arm 110 counterclockwise so that the lock 120 will engage the shoulder 122 carried by the crank arm 78 thereby locking the latter in its counterclockwise limit so as to continue the driving engagement between the power roll and the pulley

72 so long as the lock arm 110 is in engagement with the crank arm 78.

In order to unlatch the carriage return clutch, a link 124 is interconnected between an arm 126 of the lock arm 110 and a bell crank 128 which, in turn, is pivotally supported about a pin 130 carried by a typewriter frame. Counterclockwise rocking of the bell crank 128 exerts a pull on link 124 to the right (as viewed in Fig. 6), which will rock the lock arm 110 clockwise to disengage the latch 120 from the shoulder 122 thereby permitting spring 106 to act upon crank arm 78 to rotate the latter clockwise so as to remove the arm 74 to its clockwise limit thereby disengaging the pulley 72 from the continually rotating power roll 70.

In order to rock the bell crank 128 counterclockwise, it is connected by a link 62 previously mentioned to the bell crank 58 which, in turn, is pivotally supported about the pin 60 carried by the typewriter frame. With this structure, when the bell crank 58 is rocked counterclockwise, as viewed in Fig. 4, in response to the depression of the bail 52, a pull is exerted on link 62 which will unlatch the carriage return clutch and thereby release the tension on tape 38.

Upon depression of the carriage return key lever 86, a pull will be exerted on the tension tape 38 which will be in the direction of the arrow in Fig. 1. This tension will be transmitted via the pulley 42 to the selector 18 which will tend to be moved to the right thereby rotating the drive pulley 32 clockwise as viewed in Fig. 1.

It will be remembered, however, that the paper feed rolls (not shown) act normal to the platen 4, to create a considerable amount of friction (thereby necessitating a great force to rotate the pulley system 22). Consequently, instead of immediately moving the selector 18, along the selector bar 36, the tape 38 will act to restore the carriage to its left hand margin position (since it will take much less force to return the carriage to its left hand margin than it will to move the selector 18). After the carriage has reached the limit stop of the left hand margin position, however, the tension in the tape 38 will then act to pull the selector 18 to the right as viewed in Fig. 1 until the selector arm 50 strikes one of the active stops 14'. When the stop 14' is engaged, the continued tension on the tape 38 will then act to rock the selector arm 50 counterclockwise as viewed in Fig. 4, from its active position shown by the solid line to its power cut off position shown by the dash-dot line. In moving to the cut off position, the selector arm 50 will have depressed the bail 52 to its dot-dash line as shown in both Fig. 4 and Fig. 5, thereby rocking the bell crank 58 counterclockwise about its supporting pin 60 to exert a pull on link 62 which, as previously mentioned, will unlatch the carriage return clutch and take the tension off the tape 38. When the tape tension has been released, then a spring 132 which is interconnected between the ear 26 of the selector 18 and the pin 46 will pull the latter back to its inactive end of the slot 48 whereupon the springs 54 which interconnect the bail 52 with the carriage end plates 9 and 11, will act to rock the selector arm 50 clockwise in the slot 48 to return the selector arm 50 to its inactive position shown in Fig. 1.

It has been found with this construction of the selector arm 50 that, when a pull is again exerted on a tape 38, the stop end 136 of the selector arm 50 will slip under the active stop 14' before the pin 46 gets into its active position in the inclined slot 48.

More specifically, when the stop end 136 of the selector arm 50 hits an active stop 14', the continued pull on the tape 38 advances the selector 18 from the solid line position of Fig. 4, to the dash-dot line position in forcing the pulley 56 to its power cut off position, or the dash-dot line position of the selector arm 50 in Fig. 4. Accordingly, upon disconnecting the carriage return clutch, the selector arm 50 will be restored to its inactive position of Fig. 1, then the next pull on the tape 42 will act on pin

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46 to pull it up to its active position of Fig. 4 but the end portion 136 will slide under the active stop 14 which had previously limited its travel.

As the selector 18 is advanced across the rail 36, it will eventually meet a pin 138 which is adjustably positioned in one of the holes 139 in the rail 36 to limit the movement to the right of the selector 18 in accordance with the length of the form to be used. When the edge 140 of the selector 18 strikes the pin 138, the selector bar 36 will be moved to the right an extent determined by the length of an elongated slot 142 and a rivet 144. In moving to the right as determined by the slot 142, the end of the selector bar 36 will strike a bell crank 146, which is pivotally supported on the typewriter frame by a rivet 148, thereby rocking the bell crank 146 counterclockwise until its nose 150 pushes on a button 152, which button acts to release a clutch 153 (later described) which interconnects the pulley 32 and the driving gear 10, whereupon a coil spring 154 which was tightened as the pulley 32 was rotated clockwise takes over after the carriage return clutch has been disconnected by the depression of the bail 52, and pulls the selector 18 to the left along the selector bar 36 towards its rest position.

It will be noted that, unless the selector bar 36 is locked in its right extreme position, as soon as the selector is moved to the left away from the pin 138, the bell crank 146 will again be rocked clockwise to re-engage the clutch and hence re-establish the driving relationship between the gear 10 and the pulley 32. To prevent this, a lock is provided at the left hand end of the selector bar 36. The lock, as more particularly shown in Figs. 2 and 3, comprises an arm 156 which is pivotally supported by a pin 158 on the selector bar 36. As the selector bar 36 is moved to the right, the arm 156 will drop from the solid line position to the dotted line position under the influence of spring 157 whereupon the shoulder 160 will engage a pin 162 locking the selector bar 36 in its right hand limit position thereby keeping the clutch released. When the selector 18 has been moved to the left hand limit under the action of spring 154, the end 164 of the selector 18 will strike on nose 166 on the arm 156 to rock the arm 156 clockwise about pin 158 thereby disengaging the shoulder 160 from the pin 162 to permit the selector bar 36 to be moved to its left hand position under the control of spring 168 thereby re-engaging the clutch that connects the pulley 32 and the driving gear 10 so that the mechanism is operable on the next form which is to be positioned on the platen printing line. Upon the next operation of the carriage return mechanism, the selector 18 will act to position the form so that its first printing line will be in alignment with the printing line of a platen and this position will be determined by one of the stops 14' having been moved to the active position.

Clutch

The platen release clutch 153 can be any sort of a release mechanism that may be engaged and disengaged under the control of an actuating pin 152. In the embodiment of the clutch shown in the drawings, a well known platen clutch such as that shown in U. S. Patent 2,120,360 was employed to disengage the gear 10 from the pulley 32.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a typewriter having a movable carriage including a platen rotatably supported on the carriage for holding a worksheet and advancing it line by line into print-

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ing position, a device for automatically rotating said platen to position predetermined lines of the work sheet successively in printing position comprising a stop bar having settable stops with each stop corresponding to a line on the printing form, means mounting said bar on the carriage, a selector bar mounted on said carriage parallel to said stop bar and having a selector slidable axially thereof to engage said set stops successively, means including a clutch operated pull tape for advancing said selector across said selector bar into engagement with said set stops, driving means interconnecting said selector and said platen to advance the latter in response to the movement of the said selector along said selector bar, and clutch disengaging means for releasing the tension of said pull tape after said selector has engaged a stop thereby positioning a line on said form corresponding to said stop into printing position.

2. In a business machine having a movable carriage and a platen rotatably supported on the carriage, a device for automatically advancing said platen on said carriage to position predetermined lines of a form in printing position comprising means positioning settable stops on said carriage with each stop corresponding to a line on the printed form, a selector guide mounted on said carriage and carrying a selector slidable from a starting position axially thereof to engage set stops successively, selectively operated means including a clutch controlled pull tape for advancing the selector along said selector guide, driving means interconnecting said selector and said platen to advance the latter in response to movement of the selector along said selector guide, and clutch disengaging means operated by said selector after it has engaged a stop for releasing the tension on said pull tape whereby a printing line on said form corresponding to the engaged stop is advanced to printing position.

3. In a typewriter having a movable carriage including a platen supported on the carriage for holding a worksheet and advancing it line by line into printing position, a device for automatically restoring said carriage to the left hand margin position and rotating said platen to position predetermined lines of the worksheet successively in printing position comprising means mounting settable stops on said carriage with each stop corresponding to a line on a printed form, a selector guide mounted on said carriage and having a selector slidable axially thereof for engagement with said set stops, driving means interconnecting said selector and said platen to advance the latter in response to the movement of said selector across said selector guide, selectively operable means including a clutch controlled pull tape for sequentially restoring the carriage to its left hand margin position and advancing the selector across the selector guide, and clutch disengaging means operable by said selector for releasing the tension of said pull tape after said selector has engaged said stop thereby positioning a line of said printed form corresponding to said stop in printing position.

4. In a typewriter having a carriage and a platen rotatably supported on the carriage, a device for automatically advancing said platen to position preselected lines of a printing form in printing position comprising means mounted on the typewriter carriage for holding settable stops with each stop corresponding to a line on the printing form, a selector guide mounted on said typewriter carriage and having a selector slidable axially thereof from a starting position into engagement with selected ones of said settable stops successively, selectively operated means including a clutch controlled pull tape for advancing the selector along said selector guide, driving means interconnecting said selector and said platen to advance the latter in response to the movement of said selector along said selector guide, and clutch disengaging means operated by said selector for releasing the tension on said pull tape after said selector has engaged

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a predetermined one of said settable stops thereby positioning a line of said printing form corresponding to said stop in printing position, said platen driving means having a capstan rotatable in response to the movement of said selector in either direction along said selector guide; platen advancing means, and a capstan clutch interconnecting said platen advancing means with said capstan whereby said platen advancing means is driven by said capstan only when said clutch is engaged.

5. In a typewriter having a carriage and a platen rotatably supported on the carriage, a device for automatically advancing said platen to position preselected lines of a printing form in printing position comprising means mounted on the typewriter carriage for holding settable stops with each stop corresponding to a line on the printing form, a selector guide mounted on said typewriter carriage and having a selector slidable axially thereof from a starting position into engagement with selected ones of said settable stops successively, selectively operable means including a clutch controlled pull tape for advancing the selector along said selector guide, driving means interconnecting said selector and said platen to advance the latter in response to the movement of said selector along said selector guide, clutch disengaging means operated by said selector for releasing the tension on said pull tape after said selector has engaged a predetermined one of said settable stops thereby positioning a line of said printing form corresponding to said stop in printing position, said platen driving means comprising a capstan rotatable in response to the movement of said selector in either direction along said selector guide, platen advancing means and a capstan clutch interconnecting said platen advancing means with said capstan whereby said platen advancing means is driven by

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said capstan only when said capstan clutch is engaged, capstan clutch disengaging means operable in response to said selector reaching a predetermined position on said selector guide, said capstan having spring means biasing the same in one direction to reset said selector to its starting position on said selector guide when said capstan clutch has been disengaged, means holding said capstan clutch in its disengaged position until said selector is restored to its starting position, and means reengaging said capstan clutch after said selector reaches its starting position.

6. In a typewriter having a movable carriage and a platen rotatably supported on the carriage, a device for automatically advancing said platen on said carriage comprising settable stops positioned in a pattern on said carriage to represent each line position respectively of a work sheet which may be positioned on said platen; a selector slidably mounted on said carriage to engage said stops successively, selectively controlled means operable in steps to move said selector into engagement with the next stop in said pattern, and driving means operable in response to movement of said selector in one direction for advancing said platen to a position wherein a line on a work sheet, corresponding to the stop arresting the movement of said selector, is positioned in printing position.

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