

March 6, 1951

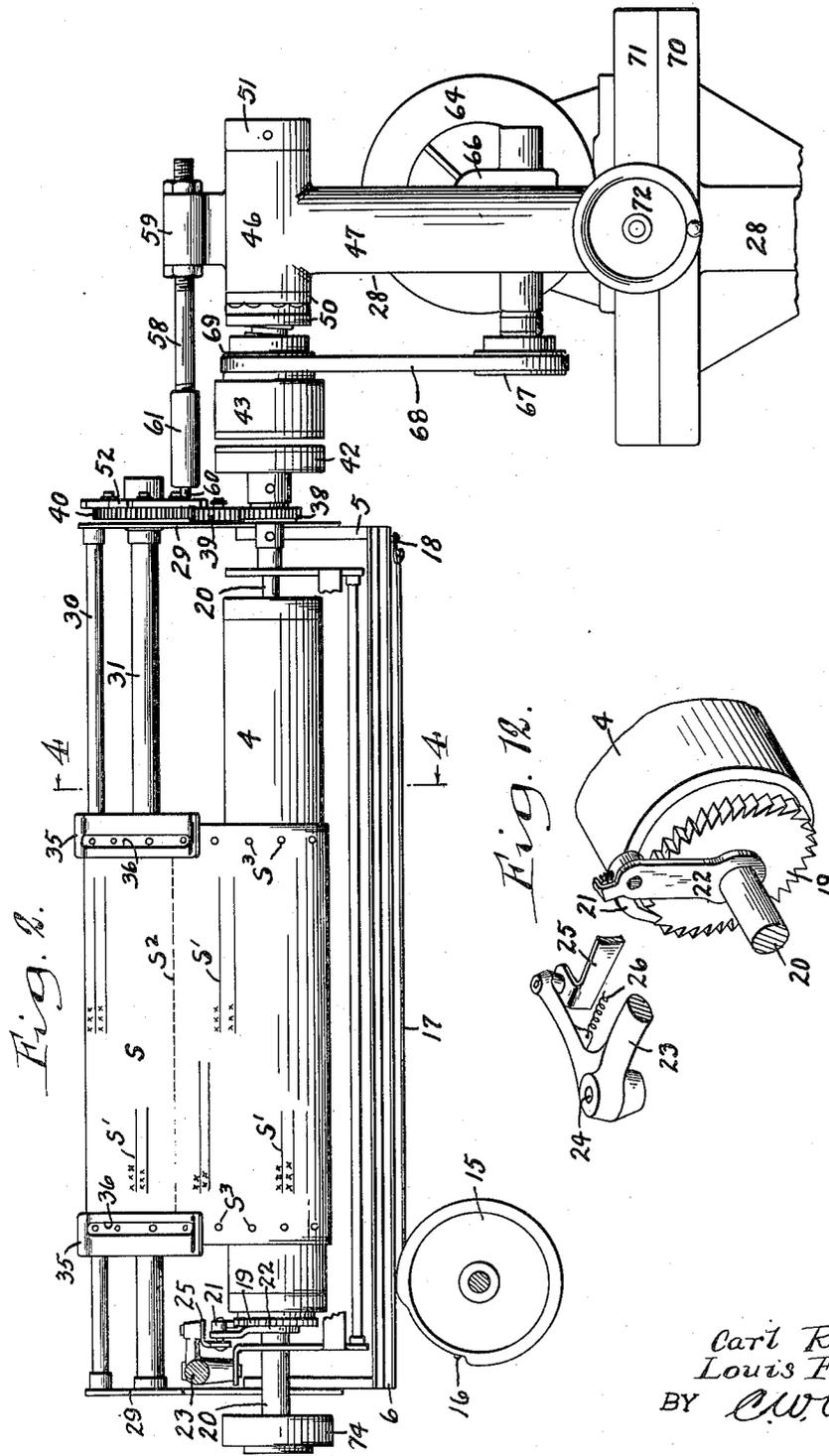
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2,543,919

FEEDING MECHANISM FOR WRITING MACHINES

Filed May 21, 1946

4 Sheets-Sheet 2



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4 Sheets-Sheet 3

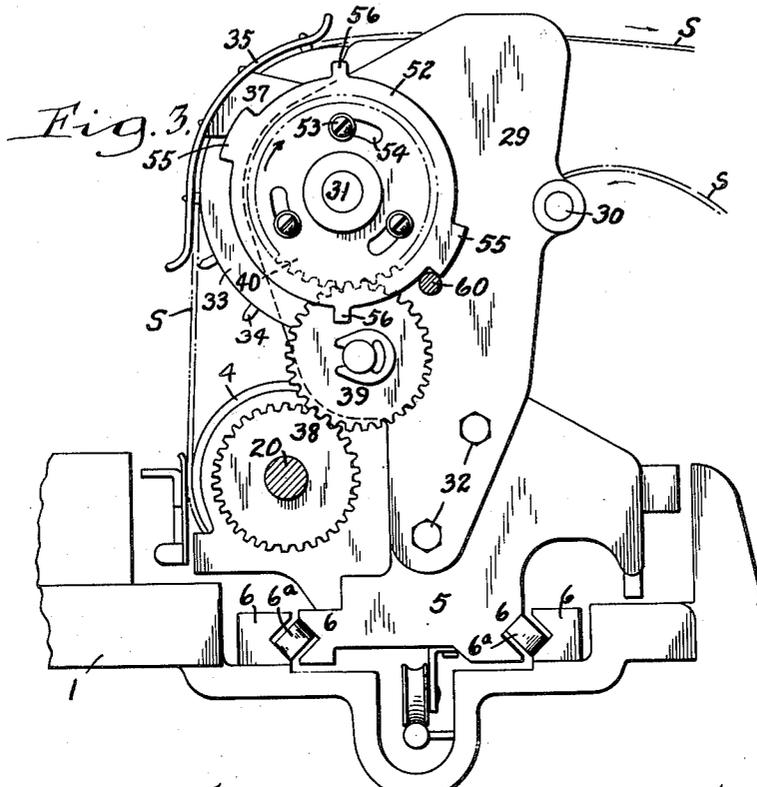


Fig. 9.

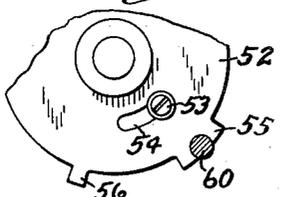


Fig. 8.

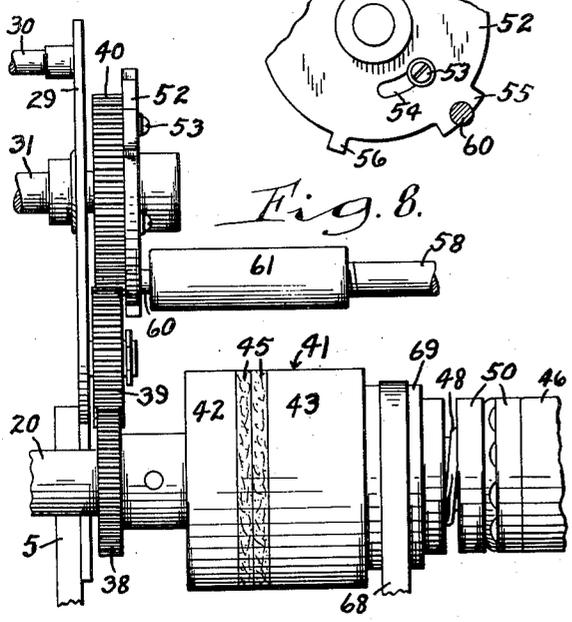
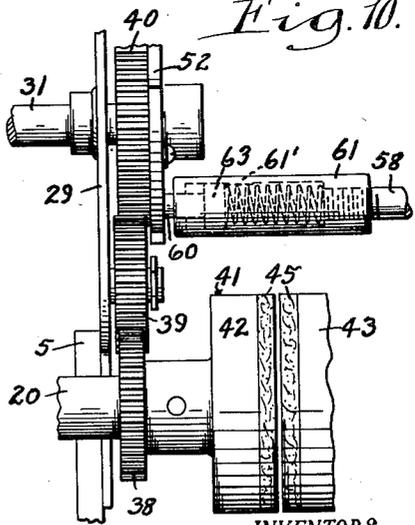


Fig. 10.



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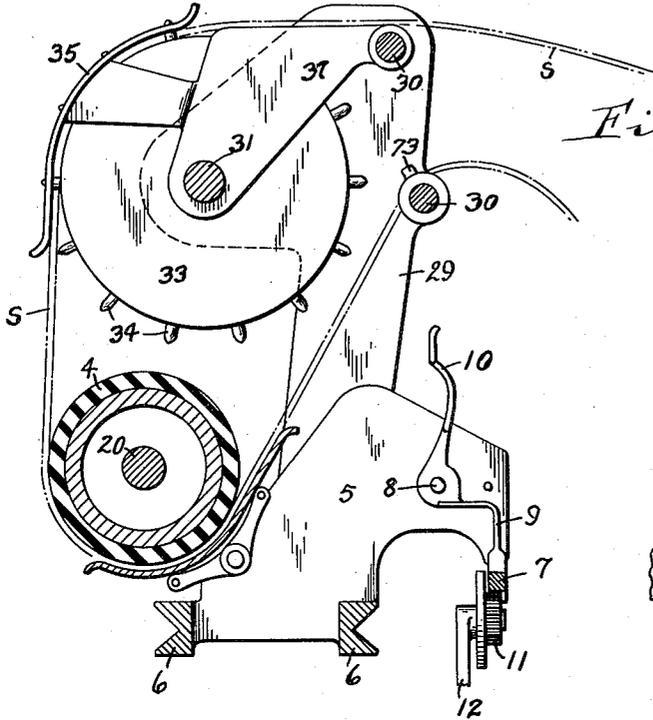


Fig. 4.

Fig. 5.

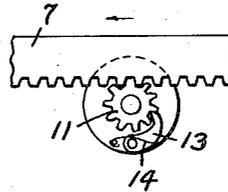


Fig. 6.

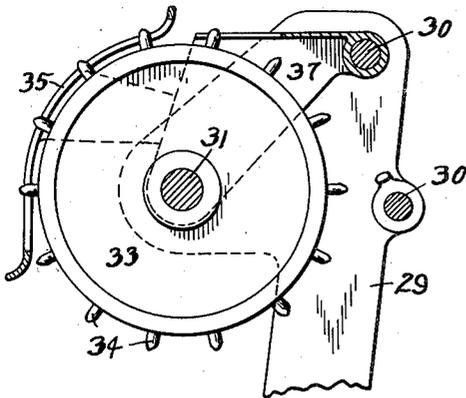
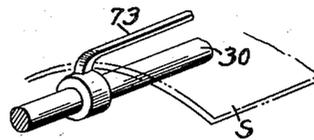


Fig. 7.



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2,543,919

FEEDING MECHANISM FOR WRITING MACHINES

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Application May 21, 1946, Serial No. 671,318

40 Claims. (Cl. 197-133)

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This invention relates to improvements in typewriting machines or like writing machines of the type employing a cylindrical writing platen supported by a movably mounted carriage which is shiftable for letter spacing and for return movements, and provided with a feeding mechanism for feeding the record sheets, strips, or assemblies thereof for line spacing or for other purposes. More particularly the invention relates to improvements in the feed mechanism for feeding the record form strips or assemblies for line spacing, or to advance them with reference to the writing line of the machine, and to shift them from one form length to another of a long continuous record form strip, or an assembly of such strips which are quite commonly interleaved with long continuous carbon or transfer strips for the purpose of transferring the inscriptions to the underlying record strips.

It is a general object of the invention to provide in writing machines of the class mentioned, an improved strip feeding mechanism for advancing the record forms with reference to the writing line of the platen, and adapted not only to feed the forms for letter spacing but to shift or eject them automatically from one writing position to another very rapidly without requiring any special attention on the part of the operator, thus saving a great deal of time in inscribing the data upon the forms, and also assuring the correct entry of the data in the areas or spaces provided therefor on the record forms.

Another object of the invention is to provide for machines of the class mentioned, an improved feeding means for the record strips or forms and providing for feeding the forms through one or a plurality of short distances for line spacing, and subsequently automatically feeding them for a predetermined distance to shift the writing line from one position to another on the record forms, or to shift or eject them to the next successive set of record forms or form lengths.

A further object of the invention is to provide for machines of the class mentioned, an improved record form feeding mechanism that can readily be applied to typewriting machines of known standard construction so as to supplement the line spacing means usually provided on such machines, and to provide for quickly shifting or ejecting the record forms from one writing position to another either on the same set of forms or on the next succeeding form of a long continuous record form or assembly.

Still another object of the invention is to provide for typewriting machines of the class men-

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tioned, a strip feeding mechanism having an improved automatic auxiliary drive therefor automatically operative to advance or eject the record forms through predetermined distances with reference to the writing line, and automatically set in operative condition by shifting of the typewriter carriage in its return movements to position the forms for the beginning of a new writing line.

According to another feature of improvement of the strip feeding mechanism a driving clutch is automatically set in feed driving condition by shifting of the typewriter carriage in positioning the record forms to begin a new writing line, thus automatically feeding the forms through the driving clutch by means of a power drive which is ordinarily continued in driving condition during the writing operation, the record forms thus being fed by means of the power drive for a predetermined distance into a new writing position and stopped in correctly aligned position with the writing line of the machine so that the entries are made in the proper spaces or lines provided therefor on the forms.

A further object of the invention is to provide for machines of the class mentioned, an improved record form feeding mechanism with an automatic drive therefor operable to shift the record forms from one writing position to another substantially instantaneously and without requiring the particular attention of the operator, thus accomplishing important savings of time in filling in the forms, and at the same time providing means for entering the inscriptions more accurately in the spaces provided therefor on the blank record forms.

Another object of the invention is to provide for machines of the class mentioned, a record form feeding mechanism having an improved automatic drive set in operative driving condition by shift of the typewriter carriage and having a checking or control device to prevent its setting in operative condition by a carriage shift except after a predetermined number of line spacings or when it is desired to feed the record forms into a new writing position with reference to the writing line of the platen, thus to provide for writing a plurality of single spaced lines, as for example in the heading of a bill or letter, and then shifting the record forms for a relatively long distance to inscribe the body of the letter or bill, or ejecting them for writing the next successive set of forms.

According to another feature of improvement of the invention, the control for the automatic

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drive for the strip feeding mechanism is provided with an improved stop or checking device set in position by line spacing movements so as to initiate strip feed thereby after a predetermined number of line spacing movements of the feeding mechanism.

Another object of the invention is to provide for writing machines of the class mentioned, an improved automatic drive for the strip feeding mechanism having a driving clutch automatically engageable upon manual shift of the typewriter carriage but released from driving condition as soon as the manual shifting pressure on the carriage is released.

Another object is to provide an adjustment of the driving clutch for the strip feeding mechanism so that the clutch is engageable in driving condition upon different extents of shifting movements of the typewriter carriage so as to start the new writing line at different positions on the record forms.

Other objects of the invention will be in part pointed out in the following detailed disclosure of an illustrative but preferred embodiment of the invention, and will be in part obvious as the disclosure proceeds.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more comprehensive disclosure of the nature, objects and advantages of the invention, reference is had to the following detailed description and to the accompanying drawings, in which:

Fig. 1 is a front perspective view of a typewriting machine of known standard construction but being equipped with the present invention;

Fig. 2 is a fragmentary enlarged elevation showing a part of the typewriter carriage together with the improved record strip feeding mechanism and control therefor;

Fig. 3 is a fragmentary enlarged end elevation of the typewriter carriage, showing parts of the improved strip feeding mechanisms and parts of the control mechanism for the auxiliary feed driving means;

Fig. 4 is an enlarged vertical longitudinal sectional and elevational view showing the cylindrical writing platen in transverse section and parts of the feeding mechanism in elevation, the section being taken substantially on the line 4-4 of Fig. 2 looking in the direction of the arrows;

Fig. 5 is a fragmentary detail elevation of a part of the typewriter mechanism for controlling letter spacing movements of the carriage;

Fig. 6 is a fragmentary detail section and elevation showing a pin wheel of the strip feeding mechanism;

Fig. 7 is a fragmentary detail perspective view of a guide for the record strip forms;

Fig. 8 is a fragmentary enlarged elevation of the driving clutch for the auxiliary driving mechanism for the strip feeding mechanism with parts of the control mechanism therefor, the clutch being engaged in driving position;

Fig. 9 is a fragmentary detail elevation and section showing the control disc or plate forming a part of the control for the auxiliary feed driving means;

Fig. 10 is an elevation similar to that of Fig. 8 with the driving clutch disengaged;

Fig. 11 is an elevation with parts in central section of one part of the driving clutch and the

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supporting bearing therefor together with parts of the control mechanism; and

Fig. 12 is a fragmentary perspective view of the ratchet line spacing mechanism of the typewriting machine.

Since the improved strip feeding mechanism is designed for application as an attachment to various typewriting machines, it is herein shown and described as being applied in this manner to a typewriting machine of well-known standard construction. Also since this typewriting machine is well-known to those skilled in the art, it is deemed unnecessary to describe it herein in detail. However, such parts thereof as particularly cooperate in combination with the improved strip feeding mechanism and the auxiliary drive therefor are herein described in order that the cooperation and functioning of the improved feeding mechanism may be clear.

As shown, the standard typewriter embodies a frame 1 having a keyboard provided with a multiplicity of type keys 2 mounted in the usual manner at the front of the machine and connected to type bars carrying type for the letters of the alphabet and for other characters used in the writing machine. Upon depressing the type keys the type bars are moved to carry the type to print or write substantially at the point 3 upon the record forms or strips S supported upon the cylindrical platen 4. The point 3 at which the writing is entered upon the record forms determines the writing line of the platen. Thus it will be understood that the characters are applied in a line extending across the record forms and parallel to the axis of the cylindrical platen, the platen being movable with the typewriter carriage to effect letter spacing along the writing line.

The typewriter is equipped with a movable carriage 5 carrying the cylindrical platen 4 rotatably mounted in bearings thereon so as to be longitudinally movable for letter spacing and return movements with the longitudinal movements of the carriage. As shown in Figs. 3 and 4, both the main frame of the typewriter and the carriage 5 are provided with supporting rails 6 for supporting the carriage for these movements. Roller bearings 6a engage the supporting rails to provide an antifriction bearing support for the carriage.

For controlling the longitudinal movements of the carriage 5 for letter spacing and for return movements, a holding device including a rack bar 7 having teeth positioned along its lower edge is pivotally mounted upon the carriage frame at 8 by means of supporting arms 9, one of which is shown in Fig. 4. One of these supporting arms 9 is provided with an operating handle 10 whereby the operator may swing the rack bar on its pivotal supports away from the normal operative position shown in Fig. 4. A rotary toothed pinion 11 is mounted on a part or bracket 12 attached to the typewriter frame 1 so that its teeth engage with the teeth on the underside of the rack bar 7 when the latter is in its normal operative position. A pivoted ratchet pawl 13 is also mounted on the bracket 12 being urged by a spring 14 into engagement with the teeth of the pinion 11 so as to prevent rotation thereof in one direction and thus hold the typewriter carriage against movement in one direction, viz. letter-spacing direction. However, movement of the carriage in the opposite or return direction is permitted because the pawl 13 rides freely over the teeth of the pinion. As well-known in the art a key-operated release (not shown) is provided to release this holding device for letter spacing move-

ments of the carriage at each depression of a type key. When it is desired to release the carriage to movement in letter-spacing direction, the operator engages the handle 10 swinging the rack bar 7 outwardly from engagement with the teeth of the ratchet wheel or toothed pinion 11, whereupon the carriage is freely movable in that direction.

Referring particularly to Fig. 2 of the drawing, a spring operating mechanism is connected to the carriage 5 normally urging the latter for movements to effect letter spacing. As shown, this machine is equipped with a rotary spring-pressed drum 15 mounted on the typewriter frame, to the periphery of which is connected as at 16 a flexible band 17 connected at its opposite end 18 to the typewriter carriage. The drum 15 is urged by a spring (not shown) to rotate counter-clockwise in Fig. 2 so as to wind the flexible band 17 on the periphery thereof thus continually exerting spring pressure to move the carriage 5 in letter spacing direction.

As mentioned above, the letter spacing mechanism is controlled by the type keys and other elements of the standard typewriter so as to release the carriage for operation step by step one letter space at a time, the letter spacing movements being effected by operation of the spring-pressed drum 15. Return movements of the carriage are effected by the operator exerting manual pressure against the carriage to move it in opposition to the resistance of the spring drum 15. When the carriage is thus returned, the movement of the rack bar 7 causes rotation of the ratchet wheel 11, the pawl 13 riding idly over the ratchet teeth. When the returning pressure upon the carriage is released there is a slight reverse movement of the carriage through a very short distance until the pawl 13 comes into locking engagement with the next successive tooth of the ratchet wheel 11. This slight reverse movement of the carriage cooperates functionally with the clutch for the auxiliary feed driving mechanism as later more fully described.

Typewriting machines of the type disclosed having cylindrical writing platens are usually equipped with releasable pressure rolls for pressing the record forms or strips against the surface of the platen whereby said strips are frictionally engaged and fed forwardly for line spacing by rotation of the platen. Such pressure rolls are not shown in the drawing but they may be retained on machines that are equipped with the improved strip feeding mechanism hereinafter described in detail.

As shown in Fig. 12 the typewriting machine is equipped with a ratchet feed mechanism for rotating the platen and the strip feeding mechanism step by step to effect line spacing of the record material supported on the platen. As shown, this line spacing mechanism includes a toothed ratchet wheel 19 non-rotatably secured to the platen shaft 20 and an oscillating spring-pressed pawl 21 is pivoted on a supporting arm 22 supported for oscillation upon the platen shaft 20. Manual operating means for this ratchet drive includes a hand-operated bell-crank lever 23 pivotally supported upon the carriage frame at 24 and a connecting link 25 pivotally connected at one end to the bell-crank lever and at the other end to the pawl supporting arm 22. A coil spring 26 is connected at one end to the carriage frame and at the other to the bell-crank lever so as to return the latter to its normal position. By means of this operating lever, the pawl 21 can

be oscillated to rotate the platen to effect line spacing, one movement of the lever advancing the strips one line space.

As shown in Fig. 1, the typewriter is securely attached to a supporting base 27 by any convenient attaching means. This supporting base extends somewhat beyond one side of the typewriter to provide also a support for a part of the auxiliary driving mechanism indicated generally at 28 and firmly attached to the supporting base. Thus the typewriter, the improved strip-feeding mechanism and the auxiliary driving means therefor form a single unitary structure.

As mentioned, the improved record form feeding mechanism has been designed to be applied to typewriting machines of known standard construction. In the embodiment shown, this feeding mechanism has a supporting frame including end brackets or plates 29 connected by transverse structural tie rods 30 and a transverse shaft 31 rotatably mounted in bearings in the end plates. The end brackets have lower attaching extensions secured by bolts or screws 32 to the carriage 5. The feeding mechanism can thus be easily attached in operative position on the typewriter carriage or removed therefrom.

Pin feed wheels 33, each having a continuous series of feed pins 34, are non-rotatably secured upon the driving shaft 31 by any appropriate means such, for example, as set screws (not shown) so the wheels can be secured on the drive shaft with any desired spacing to accommodate record forms of different widths. A strip guide plate 35 is provided for each of the pin wheels 33, being curved to conform approximately to the periphery of the wheels and provided with a slot 36 forming a runway for the feed pins. A supporting bracket 37 is provided for each of the guide plates 35 being connected to the upper tie rod 30 and to the driving shaft 31. By means of this supporting connection, the guide plates 35 can be adjusted longitudinally of the drive shaft 31 with corresponding adjustments of the pin wheels 33.

Driving means for the pin wheels 33 as shown in Figs. 2, 3 and 8 include a train of toothed gears between the platen shaft 20 and the pin wheel shaft 31. These toothed gears include a gear 38 rigidly secured to the platen shaft 20, an intermediate or idler gear 39 and a driven gear 40 rigidly secured to the drive shaft 31 for the pin wheels. Thus when the platen is rotated in forward direction, the pin wheels 33 will be operated in like direction to feed the record strips forwardly over the platen. The gear ratio is selected to feed the strips forwardly at substantially the same speed that they are fed by the platen but the platen pressure feed rolls are preferably released during feed by the pin wheels. Therefore, when the platen is rotated by the ratchet mechanism above described for line spacing or by any other means, the pin wheels will also be operated to feed the strips forwardly.

It will be observed that the improved feeding mechanism is especially adapted for feeding record strips or forms or assemblies of the same of the long continuous traveler type such as the assembly S of strips shown in the drawing. A plurality of such long continuous strips are ordinarily arranged in superposed relation with each other and long continuous strips of transfer material are interleaved with the record strips or forms so as to transfer the inscriptions made on the top or original strip to the underlying record strips. The record strips are preferably provided

with blank forms S' providing spaces for the entry of the inscriptions, and provided with transverse weakened severance lines S^2 arranged in superposed relation at form length intervals in the several strips, whereby the inscribed sets of form leaves may be easily severed along these weakened lines after the inscriptions have been entered. The feed pins 34 of the pin wheels 33 engage in feeding relation with series of feed apertures S^3 in the strips in well-known manner.

In order that the record strips or forms may be initially positioned on the pin wheels 33 so that the record forms S' bear a definite relation to the writing line of the platen at different stages of operation, one or more of the feed pins 34 of each of the pin wheels may be marked in such a manner as to give it a characteristic appearance. Then, when the forms are placed upon the pin wheels the marked pins are placed in the feed apertures of the strips bearing a definite relation to the blank forms. Thus the position of the forms with reference to the writing line can be controlled so as to bring appropriate parts at the writing line at different stages of the feeding operation.

For driving the feeding mechanism by the auxiliary driving means, a driving clutch, indicated generally at 41, is provided as best shown in detail in Fig. 8. This driving clutch includes a clutch part or head 42 pinned to the end of the platen shaft 20 extending beyond the driving gear 38 and a similar clutch part or head 43 positioned adjacent to the part 42 and secured to a short supporting shaft 44. The adjacent surfaces of the clutch parts 42 and 43 have facings 45 of stout durable friction material such as leather or the like. The clutch head or part 43 is rigidly attached to the supporting shaft 44 so as to rotate therewith and the supporting shaft 44 is rotatably supported in a bearing 46 connected to the supporting post or pedestal 47 of the driving or power unit 28 of the auxiliary driving mechanism.

As best shown in detail in Fig. 11 the clutch head or part 43 together with its supporting shaft 44 is supported for slight longitudinal movements in the bearing 46, such movements being resisted by a coil spring 48 surrounding the shaft and seated at one end in a pocket formed in the integral extension 49 of the clutch head 43. The opposite end of the spring is seated against a thrust bearing 50 supported against the end of the bearing 46. A bearing collar 51 is pinned to the opposite or outer end of the shaft 44 engaging the adjacent end of the bearing 46 so as to limit movements of the clutch head 43 and shaft 44 under the influence of the spring 48 which is compressed so as to yieldingly urge the clutch head toward the left as viewed in Fig. 11.

Supported on the outer face of the driven gear 40 of the gear train mounted upon the typewriter carriage is a control plate or disc 52. This control disc as shown is substantially circular, preferably made of metal, and secured to the outer face of the gear 40 by means of screws 53 respectively extending through elongated slots 54 in the plate so as to provide for rotary adjustment of the plate with reference to the gear. Stop lugs or projections 55 and 56 are arranged in spaced relation along the peripheral edge of the control disc 52, the lugs 55 being somewhat wider in circumferential extent than the lugs 56. Also the circumferential spacing of these lugs varies for a purpose fully described below. The control disc 52 faces outwardly toward the driving or power

unit 28 of the auxiliary driving mechanism. The control disc and gear train are preferably enclosed by a housing plate 57 (Fig. 1) attached to the adjacent end bracket 29 and provided with an appropriate opening for the entrance of a control element later described.

Carried by the power unit 28 of the auxiliary driving mechanism is a control member or bar 58 extending therefrom toward the adjacent end of the typewriter carriage and in alignment with the control disc 52. This control bar is shown in the form of a metallic rod adjustably attached to a supporting lug 59 supported by and rising above the bearing 46 and extending therefrom toward the control disc 52. At its free end opposite to the supporting lug, the control bar is provided with a spring-pressed retractable control member or stop 60 mounted in a supporting sleeve 61 threaded to the adjacent end of the control bar 58 and having an interior opening in which a spiral compression spring 62 is mounted so as to bear against the inner enlarged head 63 of the control stop 60 and to continually urge the control stop outwardly as shown in Fig. 11. The control stop 60 is thus mounted and guided for reciprocating sliding movement in the end of the supporting sleeve 61. It is thus positioned for cooperation in contacting relation with the control disc 52 during return movements of the typewriter carriage for a purpose later fully described.

As above mentioned, the auxiliary driving means is preferably supplied with a power drive and this is herein disclosed in the form of a small electric motor 64 mounted upon the unit 28 and electrically connected for control through a switch 65 mounted in the base 27. The motor 64 is connected through an appropriate speed reduction gearing 66 to a drive pulley 67 connected by a driving belt 68 with a driven pulley 69 shown in Fig. 11 as being integral with the extension 49 of the clutch head 43. Since this power drive is connected under certain conditions later described to operate the strip feeding mechanism, the ratio of the reduction gearing will be such as to drive the clutch head 43 at appropriate speed for feeding the strips or shifting or ejecting them quickly from the one form length to another form length.

In order to adjust the power unit 28 of the auxiliary driving means with reference to the typewriter carriage, the upper part of said unit is made adjustable on the lower part whereby the motor 64 with its driving connections and the clutch head 43 can be adjusted toward and away from the typewriter carriage. In the embodiment herein shown for this purpose, a lower horizontal supporting plate or slideway 70 is formed on the unit 28 and an upper supporting plate 71 is similarly formed, slidably engaging in supporting relation with the lower supporting plate so as to be slidably adjustable thereon from left to right or from right to left as viewed in Fig. 2, thus enabling the power unit to be adjusted toward or from the typewriter carriage so that the clutch head 43 will engage in driving relation with the clutch head 42 in different positions of the return movements of the typewriter carriage along the supporting rails 6. In order to adjust the upper supporting plate 71 upon the lower plate 70, any appropriate manual adjusting means may be provided such, for example, as indicated by the rotary hand wheel 72 connected by any appropriate mechanism (not shown) for making this adjustment. This adjusting mech-

anism for the power unit is diagrammatically shown since specifically it forms no part of the present invention.

An illustrative embodiment of the invention having been fully set forth above, and the objects and advantages pointed out, the operation will be understood by those skilled in the art but for clearness and completeness is set forth as follows:

The assembly of record strips S is threaded into writing position over the platen 4 in the usual manner, being led from a supply such as a zigzag folded pack of record strips, over the tie rod 30 which serves as a strip guide and may be provided with guide members 73 attached to the rod 30 as shown in Fig. 7. The strips are then led over the platen 4 and the feed apertures thereof engaged with the feed pins 34 of the pin wheels 33. In order to synchronize the receiving spaces of the blank forms S' with the feeding mechanism and with the writing line of the platen, feed apertures adjacent the forward ends of the blank forms (or other designated feed apertures), will be engaged with feed pins 34 which have been specially marked for identification as above described. The platen 4 will then be manually rotated by means of the knob 74 thus driving the pin wheels to bring the first writing space of the next successive form into alignment with the writing line of the platen, whereupon the desired inscription is made upon this first writing space. It will be noted that when the platen is thus rotated to feed the strips the pin wheels are simultaneously rotated through the train of gears 38, 39, 40 to effect strip feed. It will be understood that the positive engagement of the feed pins with the feed apertures effects strip feed without any slippage and that the writing spaces of the forms are thus accurately positioned at all times with reference to the writing line of the platen.

Assuming that a plurality of lines are to be written at the forward end of each of the blank forms, spaced apart short distances as for single line spacing, the operator will actuate the operating lever 23 so as to operate the feed mechanism through the ratchet wheel 19 to move the forms forwardly a short distance for line spacing. When the operator thus actuates the lever 23 for a single stroke thereof the typewriter carriage 5 is simultaneously returned or moved to the right in Figs. 1 and 2 in a direction opposite to letter spacing movements. This movement of the carriage positions the record forms to begin the writing of a new line and at the same time the clutch head 42 approaches the driving clutch head 43 which is being continuously rotated by the motor 64. At the same time the control stop 60 of the control bar 58 contacts with the peripheral stop lug 55 of the rotary control disc or plate 52, thus retracting the stop 60 slightly against the resistance of the spring 62, but before the clutch part 42 can engage the clutch part 43 the control stop 60 is checked from further retraction by engagement of the head or support 63 with the annular shoulder 61' on the inner surface of the supporting sleeve 61. Thus the return movement of the typewriter carriage 5 is stopped prior to engagement of the two clutch parts 42 and 43 and no feeding action through the auxiliary driving means results. This positioning of the parts is indicated in Figs. 9 and 10. The writing of the next successive line on the forms is then entered by operation of the type keys in the usual manner.

After the desired number of single spaced lines have thus been entered the stop lug 55, which has been positioned during the writing of these lines in alignment with the control bar 58, will have been rotated sufficiently to position it out of alignment with said control bar, or so nearly out of alignment that the next line spacing movement will bring it fully out of alignment. In this connection it will be remembered that with each line spacing movement of the strips the control disc carrying the lugs 55, 56 is rotated a short distance through the gears 38, 39, 40.

When the carriage is next shifted or returned toward the right in Figs. 1 and 2 by actuation of the lever 23, the control stop 60 will be out of alignment with the stop lug 55. Therefore the control stop 60 is not engaged by the stop lug 55 or by any part of the control disc 52, the lug 60 being positioned just outside of the peripheral edge of the disc 52 between lugs 55, 56. Therefore the typewriter carriage is permitted to move somewhat further in its return movement, not being stopped by engagement of the control stop 60, and as a consequence the clutch part 42 engages with the rotating clutch part 43 in driving relation therewith, whereupon the platen 4 and the pin wheels 33 are quickly rotated through the power drive connections to shift the record forms to the next successive writing lines or forms S' thereof.

During this power actuation of the feeding mechanism the control stop 60 is positioned between two adjacent lugs 55, 56 of the control disc 52. Thus the control stop 60 contacts with the next stop lug 56 on the control disc, stopping the feed of the record forms when the next successive line or inscription receiving space thereof is positioned at the writing line of the platen. In this connection it will be noted that the spacing of the stop lugs 55, 56 on the control disc and the circumferential width of each of these lugs are determined by the character and spacing of the record receiving areas of the record forms. If a larger number of single spaced lines are to be entered at one part of the form, the stop lug 55 or 56 controlling that part will be made wider, and if a lesser number are to be entered the control lug will be made narrower. Also if different writing areas or forms S' of the record forms are spaced apart greater distances the spacing between adjacent lugs 55 and 56 will be greater, and if the spacing between the forms is smaller the spacing between the adjacent lugs 55 and 56 will be correspondingly diminished. It will thus be seen that the control disc 52 is specially adapted for use with a particular standard form design; if the form design is changed the control disc will need to be correspondingly changed for another of appropriate design. For this reason the control disc is constructed to be easily attached or detached.

When a form length has thus been completely inscribed the written form is quickly ejected and the record strip assembly S quickly fed by the auxiliary driving means to bring the next successive form into writing position. This quick feeding action or ejection is accomplished by the proper spacing of successive stop lugs 55, 56 on the control disc 52. In Fig. 3 of the drawing, successive stop lugs 55, 56 are spaced differently from successive adjacent stop lugs 56, 55. This is for the reason that the different writing areas of a blank form are longitudinally spaced differently from the spacing of adjacent writing spaces on two adjacent blank forms. Of

course it will be understood that the spacings of these stop lugs may be made to accord with the particular form design with which the control disc is employed. In any case the writing spaces of the forms will be stopped in exact alignment with the writing line of the platen by engagement of the control stop 60 with a stop lug 55 or 56 following each ejection.

In order to cushion the return movement of the carriage at the time the clutch part 42 moves into operative engagement with the clutch part 43 as above described, the cushioning spring 48 above described is employed. When the two clutch parts are thus moved into engagement with each other the part 43 is permitted to retract slightly against the resistance of the spring 48 thus easing the engaging action and preventing undue shock. It will be understood that the clutch parts are thus engaged by the operator returning the typewriter carriage to its initial writing position, and such movement is usually made quickly causing considerable inertia due to the moving parts.

Also it will be noticed that the clutch parts 42 and 43 are held in operative driving engagement with each other by pressure exerted upon the typewriter carriage by the operator. So long as this pressure is exerted upon the carriage the clutch is held engaged in driving position. However, as soon as the pressure is released the clutch part 42 is retracted slightly to disengage it from driving relation with the clutch part 43 due to the action of the spring-pressed driving drum 15 of the carriage and letter spacing mechanism 7 above described. As soon as the pressure on the carriage is released the carriage retracts slightly for a very short distance due to the action of this mechanism, but the retraction is sufficient to release the driving engagement of the clutch. Therefore the clutch is instantly and automatically released when the pressure on the carriage is discontinued thus avoiding objectionable wear of the clutch facings and avoiding the placing of unnecessary loads upon the auxiliary driving mechanism.

It may be desired at times to start the writing lines at different positions on the blank forms with reference to the left margins thereof. For this purpose the motor 64 with driving connections thereof including the clutch head 43 and the control bar 58 are made adjustable as a unit toward and away from the typewriter carriage as above described. Thus the power driving unit may be adjusted to the right as viewed in Figs. 1 and 2 by adjusting the supporting plate 71 upon the supporting plate 70, thus permitting the carriage to be moved further to the right in its shifting movements to begin the writing line nearer the left-hand margin of the forms. By making adjustments in the opposite direction, the starting points of the writing lines may be spaced a greater distance from the left-hand margins of the forms. Any desired locking means such as a set screw or the like (not shown) may be used to lock the power unit in adjusted positions.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

The invention having thus been fully described, the following is claimed:

1. In a writing machine, in combination, strip feeding means operable for feeding record forms for line spacing, a movably mounted carriage shiftable for letter spacing and return movements, auxiliary driving means for said feeding means for feeding the record forms, a movably mounted control device actuated by operation of said line spacing feeding means, and means controlled jointly by movement of said control device and by shift of said carriage for setting said auxiliary driving means in operation to feed the record forms.

2. In a writing machine, in combination, strip feeding means operable for feeding record forms for line spacing, a movably mounted carriage shiftable for letter spacing and return movements, auxiliary driving means for said feeding means for feeding the record forms, a rotary control disc actuated by operation of said line spacing feeding means, means controlled jointly by said control disc and by shift of said carriage for setting said auxiliary driving means in operation to feed the record forms, and means including stop lugs on said rotary disc for automatically checking the feeding means when driven by said auxiliary driving means to position the record forms with reference to the writing line of the machine.

3. In a writing machine, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically set in operation by return shift of said carriage for feeding the record forms, and means to prevent setting of said auxiliary driving means in operation by said carriage shift except after a predetermined number of line spacing feeding operations.

4. In a writing machine of the character described, in combination, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means for feeding the record forms relatively long distances, a control device including a control member mounted for operative movements in different planes and moved in one plane by actuation of said line spacing feeding means, means for moving said control device bodily into operative position in another plane, and setting means controlled jointly by said operative movements in different planes of said control device for setting said auxiliary driving means in operation.

5. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for driving said strip feeding means including a friction clutch having a continuously operating driving member normally in inoperative condition to drive the feeding means, and setting means actuated automatically by return shift of said carriage to set said friction clutch in driving condition to operate said auxiliary driving means for feeding the record forms.

6. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means, and setting means controlled jointly by operation of

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said line spacing feeding means and by shift of said carriage for setting said auxiliary driving means in operation to feed the record forms.

7. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms relatively short distances for line spacing, auxiliary driving means for said feeding means, means actuated automatically by return shift of said carriage substantially at the end of said return shift for setting said auxiliary driving means in operation for feeding the record forms relatively long distances, and means for automatically checking the feeding means when driven by said auxiliary driving means to correctly position the record forms with reference to the writing line of the machine.

8. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means for feeding the record forms relatively long distances, a driving clutch for said auxiliary driving means, and means for automatically setting said clutch in driving condition upon return shift of said carriage.

9. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means for feeding the record forms relatively long distances, a driving clutch for said auxiliary driving means, means for automatically setting said clutch in driving condition upon return shift of said carriage, and means for automatically checking the feeding means when driven by said auxiliary driving means to correctly position the record forms with reference to the writing line of the machine.

10. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically operable upon return shift of said carriage for feeding the record forms relatively long distances, and a control device for said auxiliary driving means controlled automatically by operation of said line spacing feeding means to prevent feeding operation of said auxiliary driving means when said carriage is shifted in its return movements until after a predetermined number of said line spacing operations.

11. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically operable upon return shift of said carriage for feeding the record forms, a control device for said auxiliary driving means controlled automatically by operation of said line spacing feeding means to prevent feeding operation of said auxiliary driving means under predetermined conditions when said carriage is shifted in its return movements, and a positive stop device for automatically checking the feeding means when driven by said auxiliary driving means to cor-

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rectly position the record forms with reference to the writing line of the machine.

12. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically operable upon return shift of said carriage for feeding the record forms, and a control device for said auxiliary driving means operatively connected to said strip feeding means for positioning thereof by line spacing actuations, so as to prevent feeding operation thereby when the carriage is shifted in its said return movements, until after a predetermined number of line spacing operations.

13. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically operable upon return shift of said carriage for feeding the record forms, a control device for said auxiliary driving means operatively connected to said strip feeding means for positioning thereof by line spacing actuations, so as to prevent feeding operation thereby when the carriage is shifted in its said return movements, until after a predetermined number of line spacing operations, and means whereby said control device automatically checks feed by said auxiliary driving means to correctly position the record forms with reference to the writing line of the writing machine.

14. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically operable upon return shift of said carriage for feeding the record forms, a control device for said auxiliary driving means including a movable part mounted on said carriage and a stationary part, and means operatively connected to said strip feeding means for positioning said movable control part by line spacing actuations, whereby said stationary part cooperates with said movable part so as to prevent feeding operation by said auxiliary driving means upon each said return shift of the carriage until after a predetermined number of line spacing operations, whereupon said movable part is positioned to permit actuation of said auxiliary driving means upon shift of said carriage in the said return movements thereof.

15. In a writing machine of the character described, in combination, a movably mounted record strip carriage shiftable for letter spacing and return movements, strip feeding means operable for feeding record forms for line spacing, auxiliary driving means for said feeding means automatically operable upon return shift of said carriage for feeding the record forms, a control device for said auxiliary driving means including a movable part mounted on said carriage and a stationary part, and means operatively connected to said strip feeding means for positioning said movable control part by line spacing actuations, whereby said stationary part cooperates with said movable part so as to prevent feeding operation by said auxiliary driving means upon each said return shift of the car-

riage until after a predetermined number of line spacing operations, whereupon said movable part is positioned to permit actuation of said auxiliary driving means upon shift of said carriage in the said return movements thereof, and means whereby said movable part of said control device cooperates with said stationary part to automatically check feed by said auxiliary driving means to correctly position the record forms with reference to the writing line of the writing machine.

16. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, continuously operating driving means for said strip feeding member normally out of driving condition with the latter, and means for automatically setting said driving means in operative driving condition with said strip feeding member to feed the strips upon shift of said carriage in its return movements.

17. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and having feed pins adapted to engage and feed the record strips or forms, driving means for said strip feeding member, a friction clutch for said driving means automatically set in driving condition by return shift of said carriage substantially at the end of said return shift, and a checking device for automatically checking said strip feeding member after a predetermined advancement of the record forms thereby.

18. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including a continuously operating driving member and an engageable and releasable friction driving clutch having a driven part and a driving part which is operatively connected to said driving member for continuous operation therewith, and clutch operating means automatically operated by shift of said carriage for moving said driven clutch part into operative engagement with said driving clutch part to set said driving clutch in driving condition to advance the record forms.

19. In a writing machine of the character described, in combination, a platen, a movably mounted record form carriage mounting said platen and shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage in spaced relation with said platen and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including a continuously operating driving member and an engageable and releasable friction driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, and means for automatically checking the operation of said strip feeding member by said driving means during continuing operation of said driving member and after a predetermined advancement of the record forms to position them in writing position.

20. In a writing machine of the character described, in combination, a movably mounted rec-

ord form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, and means for automatically releasing said driving clutch when the shifting pressure on said carriage is released.

21. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member, means for automatically setting said driving means in operative condition to feed the strips upon return shift of said carriage, and means controlled automatically by operation of said strip feeding member for preventing setting of said driving means in strip feeding condition when the carriage is shifted in the said return movements thereof.

22. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member, means for automatically setting said driving means in operative condition to feed the strips upon return shift of said carriage, a positive stop device for automatically checking the operation of said strip feeding member by said driving means after a predetermined advancement of the record forms to correctly position them for writing, and means controlled automatically by operation of said strip feeding member for preventing setting of said driving means in strip feeding condition when the carriage is shifted in the return movements thereof.

23. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, and means operable under predetermined conditions for preventing setting of said driving clutch in feeding condition when the carriage is shifted in the return movements thereof.

24. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, strip feeding means mounted on said carriage and operable to feed the record strips or forms for line spacing, auxiliary driving means for said strip feeding means, means controlled by line spacing operation of said feeding means for automatically setting said auxiliary driving means in operative condition to feed the strips upon return shift of said carriage, and means for varying the extent of strip feed by said auxiliary driving means at successive operations thereof.

25. In a writing machine of the character de-

scribed, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member, means for automatically setting said driving means in operative condition to feed the strips upon return shift of said carriage, means for varying the extent of strip feed by said driving means at successive operations thereof, and means for automatically checking the operation of said strip feeding member by said driving means after a predetermined advancement of the record forms.

26. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member, means for automatically setting said driving means in operative condition to feed the strips upon return shift of said carriage, means operable under predetermined conditions for preventing setting of said driving means in strip feeding condition when the carriage is shifted in the said return movements thereof, and means for varying the extent of strip feed by said driving means at successive operations thereof.

27. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, and means operable under predetermined conditions for preventing setting of said driving clutch in feeding condition when the carriage is shifted in the return movements thereof.

28. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and having feed pins adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, a movably mounted control member mounted on said carriage and operatively connected to be moved in unison with operation of said strip feeding member, and a second control member cooperating with said movable control member in predetermined positions of the latter for preventing setting of said driving clutch in driving condition when the carriage is shifted in the return movements thereof.

29. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch

in driving condition to advance the record forms, a movably mounted control member mounted on said carriage and operatively connected to be moved in unison with operation of said strip feeding member, a second control member mounted outside of said carriage and cooperating with said movable control member in predetermined positions of the latter for preventing setting of said driving clutch in driving condition when the carriage is shifted in the return movements thereof, and a checking lug on said movably mounted control member cooperating with said second control member to check strip feed after a predetermined advancement of the record forms.

30. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, a movably mounted control member mounted on said carriage and operatively connected to be moved in unison with operation of said strip feeding member, a second control member mounted outside of said carriage and cooperating with said movable control member in predetermined positions of the latter for preventing setting of said driving clutch in driving condition when the carriage is shifted in the return movements thereof, and separate driving means for actuating said strip feeding member to feed the record forms for line spacing.

31. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, a movably mounted control member mounted on said carriage and operatively connected to be moved in unison with operation of said strip feeding member, a second control member cooperating with said movable control member in predetermined positions of the latter for preventing setting of said driving clutch in driving condition when the carriage is shifted in the return movements thereof, a checking lug on said movably mounted control member cooperating with said second control member to check strip feed after a predetermined advancement of the record forms, and separate driving means for actuating said strip feeding member to feed the record forms for line spacing.

32. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, and means for adjusting said clutch for varying

the extent of carriage shift necessary to engage said clutch in driving condition.

33. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage for engaging said driving clutch in driving condition to advance the record forms, a movably mounted control member mounted on said carriage and operatively connected to be moved in unison with operation of said strip feeding member, a second control member cooperating with said movable control member in predetermined positions of the latter for preventing setting of said driving clutch in driving condition when the carriage is shifted in the return movements thereof, and means for adjusting said clutch for varying the extent of carriage shift necessary to engage said clutch in driving condition.

34. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a writing platen mounted on said carriage, a strip engaging pin feed member mounted on said carriage and having feed pins engageable in feed apertures in the record strips or forms, driving means for said pin feed member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage during said return movements thereof for engaging said driving clutch in driving condition to advance the record forms, a control disc rotatably mounted on said carriage and operatively connected to be rotated in unison with operation of said pin feed member, and a second control member cooperating with said rotary disc in predetermined positions thereof for preventing setting of said driving clutch in driving condition when the carriage is shifted.

35. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a writing platen mounted on said carriage, a strip engaging pin feed member mounted on said carriage and having feed pins engageable in feed apertures in the record strips or forms, driving means for said pin feed member including an engageable and releasable driving clutch, clutch operating means automatically controlled by shift of said carriage during said return movements thereof for engaging said driving clutch in driving condition to advance the record forms, a control disc rotatably mounted on said carriage and operatively connected to be rotated in unison with operation of said pin feed member, a second control member cooperating with said rotary disc in predetermined positions thereof for preventing setting of said driving clutch in driving condition when the carriage is shifted, and a plurality of spaced peripheral checking lugs on said rotary disc and cooperating with said second control member to check strip feed by said pin feed member after a predetermined advancement of the record forms.

36. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member

mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member, means for automatically setting said driving means in operative condition to feed the strips upon return shift of said carriage, and a control member actuated by operation of said strip feeding member and having spaced control lugs thereon for varying the extent of strip feed by said driving means at successive operations thereof.

37. In a writing machine of the character described, in combination, a movably mounted record form carriage shiftable for letter spacing and return movements, a strip feeding member mounted on said carriage and adapted to engage and feed the record strips or forms, driving means for said strip feeding member, means for automatically setting said driving means in operative condition to feed the strips upon return shift of said carriage, and a rotary control disc actuated by operation of said strip feeding member and having control lugs thereon sized and spaced apart for varying the extent of strip feed by said driving means at successive operations thereof.

38. In a writing machine, in combination, strip feeding means operable for feeding record strips for line spacing, a movably mounted carriage shiftable for letter spacing and return movements, driving means for said feeding means including a friction clutch, means for automatically setting said friction clutch in driving condition to feed the strips upon return shift of said carriage, and a positive stop device for checking the operation of said strip feeding means while said friction clutch is still in its driving condition and after a predetermined advancement of the record strips to correctly position them for writing.

39. In a writing machine, in combination, strip feeding means operable for feeding record strips for line spacing, a movably mounted carriage shiftable for letter spacing and return movements, driving means for said feeding means including a friction clutch, means automatically controlled by operation of said strip feeding means for automatically setting said friction clutch in driving condition to feed the strips upon return shift of said carriage, and a positive stop device for checking the operation of said strip feeding means while said friction clutch is still in its driving condition and after a predetermined advancement of the record strips to correctly position them for writing.

40. In a writing machine, in combination, strip feeding means operable for feeding record strips for line spacing, a movably mounted carriage shiftable for letter spacing and return movements, driving means for said feeding means including a friction clutch, means automatically controlled by operation of said strip feeding means for automatically setting said friction clutch in driving condition to feed the strips upon return shift of said carriage, a movable control member driven by said feeding means and having a stop lug thereon, and a stop member cooperating with said stop lug for positively checking the operation of said strip feeding means while said friction clutch is still in its driving condition and after a predetermined advancement of the record strips to correctly position them for writing.

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