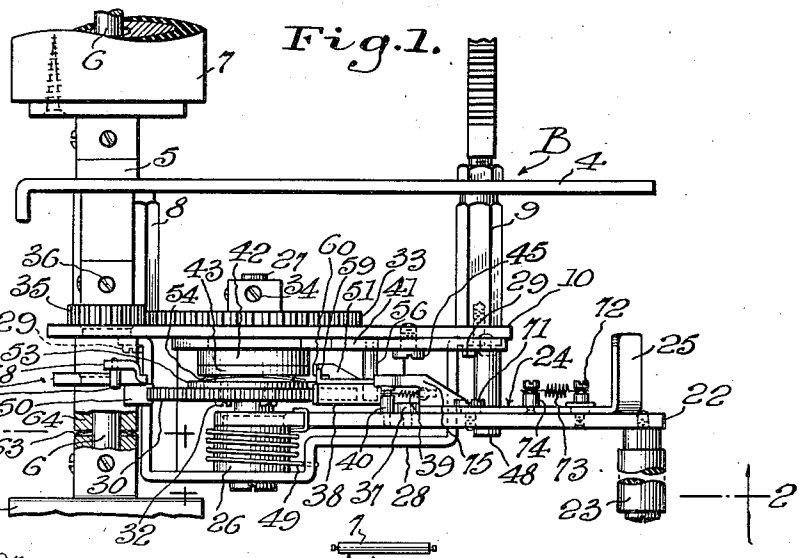
Feb. 16, 1943. G. F. HANDLEY ET AL 2,311,227

TYPEWRITING MACHINE

Filed Aug. 20, 1941 2 Sheets-Sheet 1

Fig. 1.



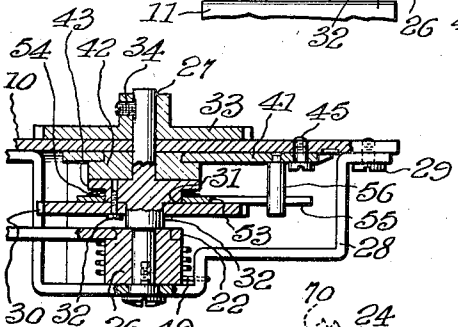


Fig. 3.

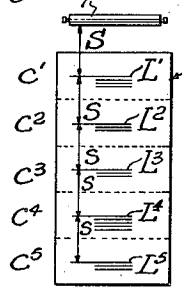


Fig. 4.

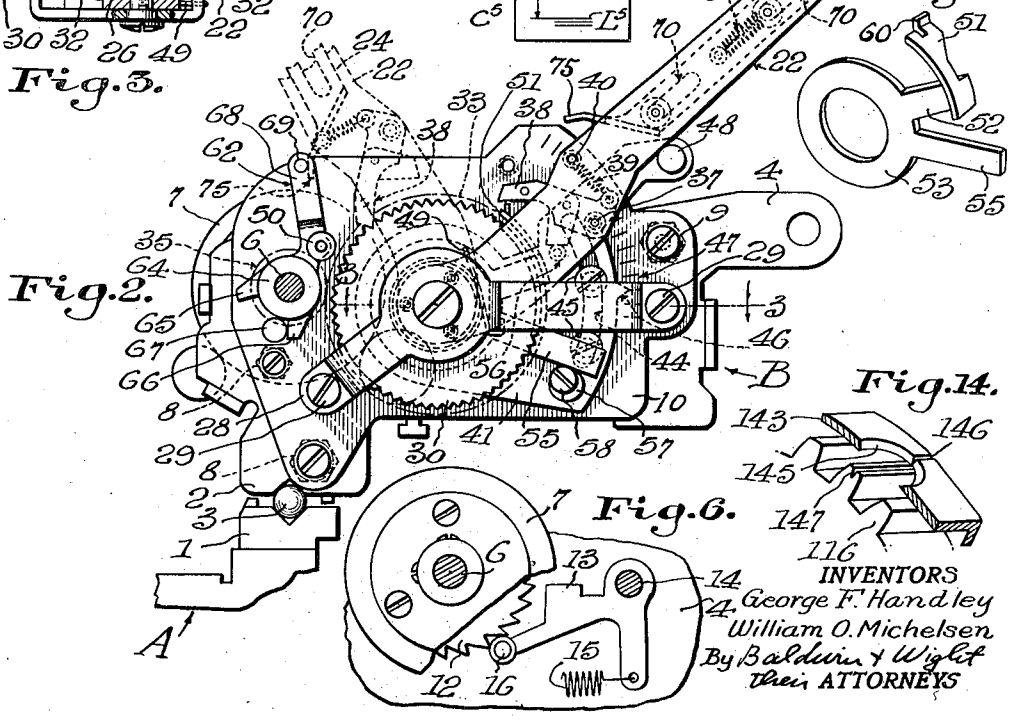


Fig. 2.

Fig. 5.

Fig. 6.

Fig. 14.

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TYPEWRITING MACHINE

Filed Aug. 20, 1941 2 Sheets-Sheet 2

Fig.7.

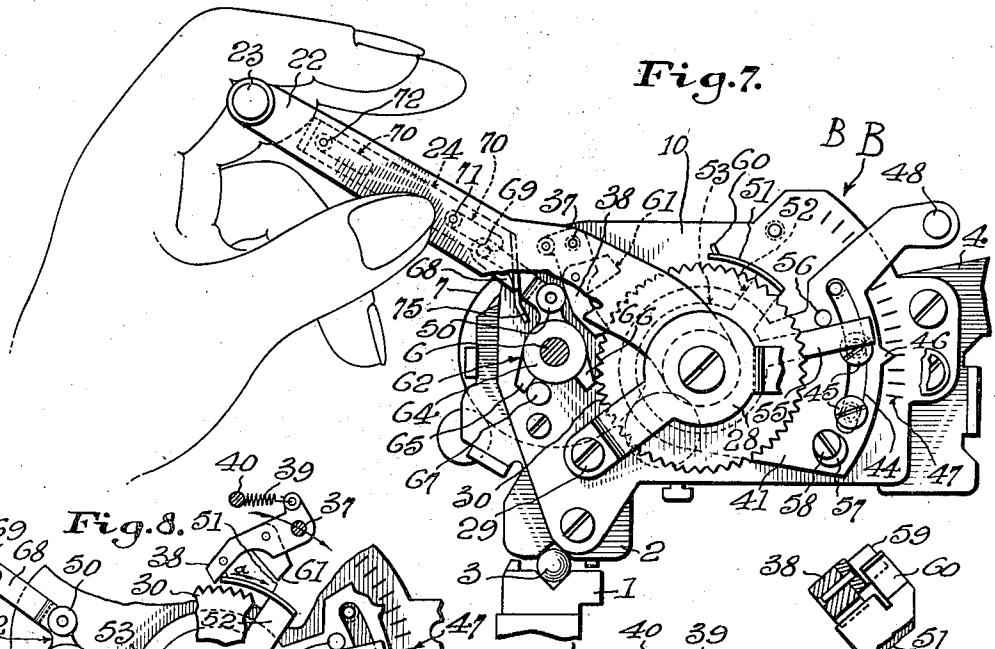


Fig.8.

Fig.10.

Fig.9.

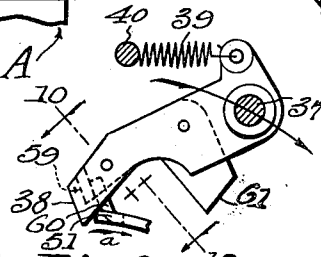


Fig.12.

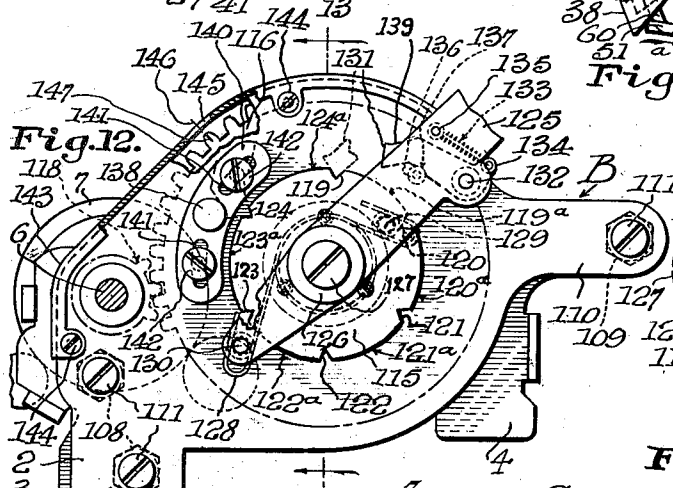


Fig.11.

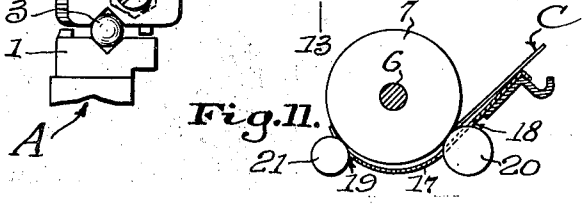
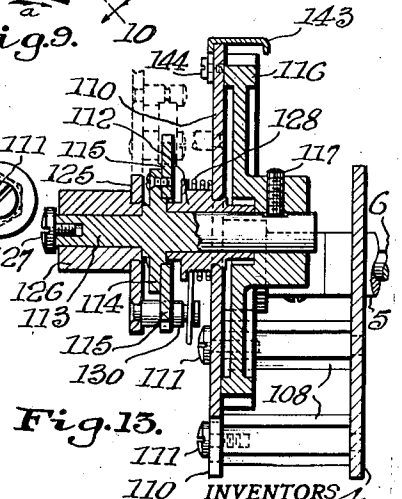


Fig.13.



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2,311,227

UNITED STATES PATENT OFFICE

2,311,227

TYPEWRITING MACHINE

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Application August 20, 1941, Serial No. 407,658

6 Claims. (Cl. 197—114)

This invention relates to typewriting machines, and more particularly to mechanism for feeding and positioning continuous webs comprising a plurality of connected form sheets.

In typing a plurality of similar invoices, checks, or similar forms, it is common practice to supply a continuous web or sheet comprising a plurality of serially connected individual forms which are fed successively to and then beyond the printing line as following forms move into printing position. The individual forms comprising the continuous web may all be the same, so that the beginning or first typed lines on all the forms will be equally spaced below the tops of the respective forms. The distance between the last line of typing on each form and the first line of typing on the next succeeding form may vary, depending upon the typing of different numbers of lines on different forms, but in any event it usually is the equivalent of a rather large number of the spaces between individual lines, i. e., "line spaces." In the interest of ease and rapidity of operation in the typing of such forms, it is desirable to provide mechanism including a member a single actuation of which, following the completion of typing on one of a series of connected forms and regardless of the number of lines typed on that form, will advance the web to position the next succeeding form for receiving its first line of typing in the same relative position, on the newly positioned form, as the first line of typing on the completed form. Such mechanism, broadly considered, has been proposed heretofore, and one of the objects of the present invention is to provide improved and efficient mechanism for feeding a web in the manner explained above.

In the copending application of one of the present applicants, namely, George F. Handley, Serial Number 377,570, filed February 5, 1941, which matured as Patent No. 2,285,087, June 2, 1942, there is disclosed and claimed a complemental feeding mechanism of the general character referred to above and which includes means for easily varying or selectively determining the feeding capacity or limit so as to make it readily adjustable to two conditions. The first such condition may be, for example, for feeding the web just the correct amount to position the leading form to receive the first line of typing, and the second condition may be for thereafter feeding the web a different amount following the completion of typing on each of the forms to position the next succeeding form to receive its first line of typing. In the copending application, the setting of the feeding capacity or limit is determined by adjustment of a selective stop device carried by the handle which is operated to drive the feeding mechanism.

Another object of the present invention is to provide another improved construction including a feeding capacity determining device in which a selectively operable stop is carried by the frame but which nevertheless is adapted to be placed in selected position by means carried by the operating handle.

A further object is to provide a simplified complemental web feeding mechanism.

Other objects will become apparent from a reading of the following detailed description, the appended claims, and the accompanying drawings, in which:

Figure 1 is a fragmentary plan view showing only some of the conventional parts of a typewriter carriage with mechanism embodying the invention applied thereto, the parts being shown in their normal or inactive positions;

Figure 2 is a fragmentary section taken on the line 2—2 of Figure 1, with parts shown in elevation;

Figure 3 is a fragmentary horizontal section taken on the line 3—3 of Figure 2;

Figure 4 is a diagrammatic development showing a work sheet or web including a series of check forms and indicating the relative lengths of spacing corresponding to initial sheet feeding after insertion of a web in the machine, line-spacing on individual forms, and feeding of the web to position successive forms to receive their first typed lines;

Figure 5 is a perspective view of a ratchet wheel shield unit;

Figure 6 is a detailed view, partly in elevation and partly in section, showing a known line-spacing detent mechanism;

Figure 7 is a view similar to Figure 2 but showing the parts in the positions occupied at the end of an operation for positioning a first or leading form of a web to receive its first line of typing following the insertion of the leading edge of the web in the machine;

Figure 8 is a detailed view, partly in section and partly in elevation, with parts broken away to show the cooperation of a pawl with a ratchet wheel shield for returning the latter to its normal or starting position;

Figure 9 is a detailed view, on an enlarged scale, showing the pawl and a part of a ratchet wheel shield;

Figure 10 is a section on the line 10—10 of Figure 9;

Figure 11 is a fragmentary, transverse, sectional view of a web-feeding cylinder or platen, pressure rolls, and paper pan;

Figure 12 is a view, partly in section and partly in end elevation, showing another construction embodying complemental sheet feeding mechanism;

Figure 13 is a section on the line 13—13 of Figure 12; and

Figure 14 is a fragmentary perspective view showing registering markers on a gear housing and gear, and drawn on an enlarged scale.

The drawings show only such parts of conventional typewriter construction as are necessary for an understanding of the manner in which paper-feeding mechanism embodying the invention may be applied to typewriters.

A part of a typewriter frame is indicated at A, and is provided with the usual frame rail 1 which supports the rail 2 of a carriage B by means of ball bearings 3. The carriage includes the usual end plates 4—4 (for the left-hand end plate, see Figure 6). A bushing 5 carried by the right-hand end plate 4 journals the right-hand end of a shaft 6 to which a sheet-feeding platen or cylinder 7 is fixed. Front and rear extension posts 8 and 9 projecting outwardly from the right-hand end plate 4 serve to mount a supplemental end plate 10 which, as explained hereinafter, supports the feeding mechanism embodying the invention. The shaft 6 is extended through and beyond the supplemental end plate 10 and its projecting end is provided with the usual platen-rotating finger knob 11. As shown in Figure 6, the cylinder shaft 6 is equipped with a line-spacing ratchet wheel 12 adapted to be yieldably held at line-spacing intervals by means of a pawl 13 pivoted as at 14 on the left-hand carriage end plate 4. A spring 15 connected to the pawl 13 and anchored on the carriage end plate 4 at a point not shown urges the pawl yieldably in a clockwise direction to effect yielding contact of the pawl roller 16 with the teeth of the ratchet wheel 12. This line-spacing ratchet and detent mechanism is of known form, being standard equipment in the Royal typewriter. As is well known, it serves to yieldably determine the successive definite positions in which the platen or cylinder 7 is yieldably held for determining predetermined line spaces. The typewriter may also be equipped with a known or suitable form of combined carriage return and line-spacing lever (not shown) adapted to drive a pawl engageable with the teeth of the ratchet wheel 12 for effecting line-spacing as an alternative to turning the platen or cylinder by means of the finger knob 11.

As shown in Figure 11, a paper pan 17 projecting downwardly from the rear of the platen and then under the platen toward the front of the latter is formed with openings 18 and 19 for accommodating rear and front pressure rolls 20 and 21, respectively, adapted to cooperate with the platen 7 for feeding the work sheet C from the rear of the platen, under it, and then up in front of the platen so as to be disposed at the printing line to be impacted by the type bars.

With the exception of the supplemental end plate 10 and its mounting on the carriage, the parts thus far described are of known form and relative arrangement, and do not constitute the present invention. The invention comprises other parts to be described and combinations of such other parts with each other and with the parts referred to above.

Before describing in detail the illustrative embodiment of the invention, and in order to facilitate an understanding of the detailed description which is to follow, reference first is made to the diagrammatic showing in Figure 4, which indicates the desired steps of feeding which the mechanism is intended to accomplish. The work sheet or web C comprises a plurality of serially arranged check forms c^1, c^2, c^3, c^4, and c^5 connected by lines of perforations at regular intervals. It is desired to type the first line L^1, L^2, L^3, L^4, and L^5 of each form at the same distance below the top edge of the form and to type an additional line or lines under the first line on each form, the number of additional lines on the several forms being different in some cases. Thus, the form c^1 may have four typed lines altogether; the form c^2 three typed lines; the form c^3 three typed lines; the form c^4 five typed lines; and the form c^5 three typed lines. It is desired to advance the web with certainty and rapidity to exactly the right position for receiving the first line L^1 of the form c^1, and then with equal ease and rapidity to position the successive forms for receiving their initial typed lines regardless of how many lines have been typed on the preceding form.

The distance S which the web must travel from the time its leading edge first engages the platen and rear pressure roller 20 as shown in Figure 11 until it is in position for receiving first line L^1 on the leading form c^1 will be a fixed amount, and, for the purposes of illustration, will be assumed to correspond to twenty-four line-spacing increments. Similarly, the distance s between the first typed line of each form and the first typed line of each succeeding form will be fixed and will be assumed to be equivalent to twenty-one line-space increments. The rotation of the platen 7 for line-spacing the web for the second and other additional lines on each sheet is effected by means of the usual line-spacing mechanism, such as the finger knob 11 or a combined carriage return and line-spacing mechanism (not shown). The feeding of the web for moving it from the position shown in Figure 11 to the position for receiving the typed line L^1 on the form c^1 is accomplished by a single actuation of an operating member 22 having a handle 23. Advancing of the web from the position occupied during the typing of the last line on any form to the position for receiving the first line on the next form also is accomplished by a single actuation of the member 22, and, inasmuch as this continuous feeding movement will differ from the movement which first positioned the form c^1 for the reception of the line L^1, a selector device 24 having a finger piece 25 is provided for selectively determining the limit of movement of the manually operable member 22. As hereinafter is explained in more detail, the finger piece 25 of the selector device 24 is depressed, and the member 22 rocked forwardly to the limit of its travel to position the form c^1 for the reception of the line L^1, whereas, for advancing the web from the position occupied when typing of the last line on the form c^1 has been completed to a new position for reception of the line L^2 on the form c^2, the finger piece 25 of the selector device 24 is released, and the member 22 then rocked to a different limit of its forward movement.

In the illustrative embodiment shown in Figures 1 to 11, inclusive, the manually operable

member 22 comprises a rock lever having a hub 26 adapted to turn or rock freely on a shaft 27 journaled on the supplemental end plate 10 and a bracket 28 secured to the end plate 10 by screws 29. A notched or toothed ratchet wheel 30 mounted on the shaft 27 is secured to a flange 31 on the shaft by screws 32. Also mounted on the shaft 27 and disposed inside of the end plate 10 is a gear 33 constrained to rotate with the shaft by a set screw 34. The gear 33 meshes with another gear 35 held fast to the platen shaft 6 by a screw 36. Pivotally mounted at 37 on the lever 22 is a pawl 38 urged into engagement with the ratchet wheel by a spring 39 connected between the pawl and a post 40 on the lever 22. In operation, when the lever 22 is rocked forwardly toward the operator, or counterclockwise as viewed in Figure 2, the pawl 38 will engage the teeth of the ratchet wheel 30 so as to drive the latter counterclockwise and, through the gears 33 and 35, drive the platen 7 clockwise; that is, in the web-feeding direction.

Means are provided for limiting the throw of the lever 22 in both directions and for automatically controlling the portion of the operating stroke during which the pawl 38 has operative connection with the ratchet wheel 33. A spacing variation adjuster or plate 41 has a hub 42 mounted on the shaft 27 between an enlargement 43 on the shaft flange 31 and the end plate 10. The hub 42 and plate 41 secured thereto are adjustable about the axis of the shaft 27. The plate 41 is formed with an arcuate slot 44 through which extend two adjustment locking screws 45 having threaded engagement with the supplemental end plate 10. The plate 41 is formed also with a pointer 46 cooperative with a set of scale markings 47 for indicating the position of adjustment of the plate 41. A stop pin 48 carried by the plate 41 limits the return movement of the lever 22 under the urge of a coiled spring 49 wrapped around the hub of the lever and having its ends anchored on the bracket 28 and the lever 22, respectively.

Normally, the limit of the forward or working stroke of the lever 22 is determined by engagement of the pawl 38 with a stop 50 positioned as shown in Figure 2, the pawl serving as a movable stop member. As will be described later, the stop 50 can be shifted under the control of the selector 24 for increasing the total amount of feed so as to position the first or leading of a series of forms in a web for receiving its first line of typing. For the present, the stop 50 may be considered as being held in the position shown in Figure 2, which is the position it occupies at all times except when the first form in a web is being moved up to the position for receiving its first line of typing.

By loosening the locking screws 45, the plate 41 and the stop pin 48 may be so adjusted as to determine the total amount of sheet feeding which can be accomplished by a single operating stroke of the lever 22. The parts will be so adjusted that, when the lever 22 is moved a complete stroke with the pawl 38 in driving engagement with the ratchet wheel 33, the web will be fed a distance corresponding to the distance between the first line of typing on one form c^1 and the first line to be typed on the next succeeding form c^2.

When more than one line has been typed on a given form, it still will be desired to feed the web with a single stroke of the operating member 22 so as to position the next form for receiving its first line of typing. To effect this complemental feeding, a shield 51 is mounted so as partially to surround the periphery of the ratchet wheel 30 and to prevent an operative engagement of the pawl 38 with the ratchet wheel during a portion of the stroke of the lever 22 corresponding to the amount by which the platen 7 has been rotated by the usual line-spacing means such as the cylinder knob 11. The shield 51 is carried by an arm 52 extending from a disc 53 rotatable on the flange 31 of the shaft 27. A spring friction washer 54 interposed between the disc 53 and the enlargement 43 of the flange 31 yieldably urges the shield 51 to rock with the ratchet wheel 30. An arm 55 extending from the disc 53 is adapted to engage a stop pin 56 on the plate 41 for limiting movement of the shield 51 during an operating stroke of the lever 22. An eccentric stop 57 held in adjusted position on the spacing variation plate 41 by means of a screw 58 is engageable by the arm 55 for limiting the movement of the shield 51 in the return direction.

Normally, after the first line is typed on a form, say, for example, the leading form c^1, the parts will be in the positions shown in full lines in Figure 2. If only one line is to be typed before advancing the form c^2 for receiving its first line of typing L^2, the pawl 38 would come into engagement with the ratchet wheel 30 immediately after the lever 22 has started its forward movement. Consequently, substantially the full stroke of the lever 22 will be utilized for rotating the platen. In Figure 2 the lever 22 and pawl 38 are shown in dotted lines in the positions occupied just prior to the end of the web-feeding stroke. When the leading edge of the pawl advances a little further, it will engage the stop 50, at which time the form c^2 will be positioned to receive its initial line of typing L^2.

If, however, the three additional lines are typed on the form c^1, making four typed lines as indicated in Figure 4, the shield 51 will have been carried around with the ratchet wheel 30 during the feeding of the web for line-spacing on the form c^1. Consequently, during the first part of the following working stroke of the lever 22, the pawl 38 will ride idly on the shield 51 for a distance corresponding to three line spaces, and will then drop into engagement with the ratchet wheel so as to drive the latter and the platen during the remainder of the working stroke of the lever 22. Thus, the feeding of the web by operation of the lever 22 is complemental to the line-spacing preceding operation of the lever, the total line-spacing being always a definite amount, so that operation of the lever 22 always will position the next form for the reception of its first line of typing.

When the lever 22 and pawl 38 are returned to the positions shown in Figure 2, the shield also must be returned. For accomplishing this, the pawl is provided with a lug 59 adapted to engage a lug 60 on the shield 51, as shown in Figure 9. When the pawl moves in the direction of the arrow *a*, the lug 59 will drive the lug 60 and shield 51 so as to return the shield to the position shown in Figure 2. Just before the completion of the return stroke, a tail 61 on the pawl engages the stop pin 56, whereupon the pawl is cammed away from the ratchet wheel 30, and the pawl lug 59 is lifted clear of the shield lug 60. The eccentric stop 57 is so adjusted that it will be engaged by the arm 55 just as the lug 59 becomes disengaged from the lug 60. The nice adjustment required for providing this timing can be made easily by turning the eccentric stop 57 slightly. Moving of the pawl out of engagement with the ratchet

wheel 30 and freeing of the lug 60 make it possible for the shield 51 to be driven frictionally with the ratchet wheel 30 when the web is line-spaced before the next operating stroke of the lever 22.

Means operable under the control of the selector 24 are provided for increasing at will the total amount of web feeding which can be accomplished by a single operating stroke of the lever 22. The stop 50 previously referred to is carried by a stop mount 62 rockable on the platen shaft 6 and yieldably held in adjusted position by a friction washer 63 interposed between the hub 64 of the stop mount 62 and the hub of the cylinder knob 11. Lugs 65 and 66 on the stop mount 62 are cooperable with a pin 67 on the end plate 10 for limiting the shifting of the mount 62. An arm 68 extending from the stop mount 62 carries a pin 69 which is adapted to be operated by the selector 24 in a manner later to be described for shifting the stop mount from the position shown in Figure 2 to the position shown in Figures 7 and 8. Normally, the stop mount is positioned as shown in Figure 2, so that the stop 50 carried thereby is placed in the path of the nose end of the pawl 38, the arrangement being such that, as soon as the nose end engages the stop 50, forward rocking of the lever 22 is terminated. When it is desired to increase the stroke of the lever 22 so as to provide an increased total feeding of the web, the stop mount 62 is shifted to the position shown in Figures 7 and 8, wherein the stop 50 is placed further away from the axis of rotation of the ratchet wheel and pawl and in position to be engaged, not by the leading end of the pawl nose, but by a portion of the pawl intermediate the nose and pivot 37, as shown in Figure 7. Thus the lever 22 and ratchet wheel 30 can move further before being arrested by engagement of the pawl 38 with the stop 50, and this additional movement provides for the increased feed necessary to position the first or leading form c^1 of the web for receiving its first line of typing L^1.

For moving the stop mount 62 to the position shown in Figures 7 and 8, the selector 24 is provided with slots 70 cooperable with screws 71 and 72 for mounting the selector to slide inwardly and outwardly on the lever 22. A spring 73 interposed between a pin 74 on the selector and the screw 72 fixed to the lever 22 urges the selector outwardly. At its inner end, the selector is formed with a stop-shifting arm 75 which is adapted, during an operating stroke of the lever and when the selector is pushed inwardly, to engage the pin 69 on the stop mount 62 to rock the stop mount from the position shown in Figure 2 to the position shown in Figures 7 and 8. The spring washer 63 interposed between the stop mount 62 and platen knob 11 frictionally and impositively couples the hub of the platen knob 11 to the mount 62 for shifting the latter to its Figure 2 position and holding it there in response to web feeding movement of the platen. The selector 24 is pushed inwardly for shifting the stop mount 62 only when the increased total web feeding is desired. When the selector is left in its normal position outwardly with respect to the lever 22, the arm 75 will not engage the pin 69 of the stop mount 62, and the mount will be maintained in its Figure 2 position.

By adjusting the position of the spacing variation plate 41 and determining its setting by reference to the position of the pointer 46 on the scale 47, the total amount of web feeding which can be effected by operation of the lever 22 can be varied according to the kind of forms to be typed upon. The setting of the plate 41 shown in the drawings could correspond, for example, to a total feed of twenty-one line spaces when the selector 24 is not pressed inwardly, and a line spacing of twenty-four when the selector has been pressed inwardly to shift the stop mount 62.

In operation, the parts will be in the positions shown in Figures 1 and 2 when the web C first is placed in the position shown in Figure 11 with its leading edge just contacting the rear pressure rolls 20 and platen 7. To position the leading form c^1 to receive its first line of typing L^1, the platen must be rotated an amount corresponding to twenty-four line spaces, corresponding to the developed distance S in Figure 4. The operator holds the selector 24 pressed inwardly by the same hand which grasps the lever 22, and then pulls the lever forwardly until it is arrested by engagement of the pawl 38 with the stop 50, as shown in Figure 7. During the latter part of this movement of the lever, the arm 75 on the selector will have engaged the pin 69 on the stop mount 62 so as to shift the latter and the stop 50 to the positions shown in Figures 7 and 8, thereby permitting the platen to be rotated an amount corresponding to twenty-four line spaces.

The four lines are then typed on the form c^1, the line-spacing for the three lines succeeding the line L^1 being effected by turning the knob 11 or operating the conventional line-spacing lever (not shown). The rotation of the platen during the line-spacing for the last three lines on the form c^1 will cause the shield 51 to move around with the ratchet wheel 30 an amount corresponding to three line-spacing increments. Therefore, when the lever 22 is moved forwardly on its next web feeding stroke to advance the form c^2 into position for receiving its first line of typing L^2, the pawl 38 will ride idly on the shield 51 for a distance corresponding to three line-spacing movements of the platen, and will then drop down into engagement with the ratchet wheel, so that, during the succeeding part of the working stroke of the lever 22, the platen will be rotated an amount corresponding to eighteen line spaces. This feeding, taken in connection with the feeding accomplished by the three preceding line-spacing increments effected by rotation of the knob 11 or actuation of the conventional line-spacing lever, will amount to a total advance corresponding to twenty-one line-spacing increments, the equivalent of which is indicated at *s* in Figure 4, this being the distance between the first lines of typing L^1 and L^2 on the adjacent forms c^1 and c^2. During this stroke of the lever 22, the selector 24 is not pressed downwardly, and accordingly the selector 75 does not engage the pin 69 on the stop mount 62. Consequently, the stop mount has been left in the position shown in Figure 2 so as to engage the leading end of the pawl nose. When the cylinder or platen is turning to feed the web following the typing of the line L^1 on the form c^1, the spring washer 63 will cause the stop mount 62 and stop 50 to be returned to their respective positions as shown in Figure 2. Consequently, when the lever 22 is operated again (without the selector's being pressed inwardly), the stop 50 will be positioned to limit the total feeding to an amount corresponding to twenty-one line-spacing increments. Ordinarily the selector is moved inwardly to shift the stop 50 to its Figures 7 and 8 position only when the

first or leading form c^1 is to be brought to starting position. Thus the forms c^2, c^3, c^4, and c^5 will be brought to starting position and line-spaced individually without pushing the selector in at all. However, it is evident that the selector device also could be used in the case of forms which, within the continuous web or sheet itself, vary as to the distance between initial lines of typing on adjacent forms.

Figures 12 and 13 show a construction embodying a simple and improved complemental sheet or web feeding mechanism. The conventional typewriter parts disclosed are similar to those embodied in the construction shown in Figures 1 to 11. A part of the typewriter frame is indicated at A and is provided with a frame rail 1 which supports the rail 2 of the carriage B by means of ball bearings 3. The carriage comprises a frame including end plates 4, one only of which is shown. A bushing 5 carried by the right-hand end plate 4 journals the right-hand end of a shaft 6 to which a sheet feeding platen or cylinder 7 is fixed. Front and rear extension posts 108 and 109 projecting outwardly from the plate 4 serve to mount a supplemental end plate 110 secured to the posts by screws 111. The platen 7 may be rotated to perform individual line-spacing increments by means such as the knob 11 shown in Figure 1, and which may be applied to the shaft 6 in Figure 12, or by the usual combined line-spacing and carriage return lever (not shown). Furthermore, the platen or cylinder may be equipped with detent mechanism such as that shown in Figure 6.

A bushing 112 fixed in the plate 110 journals a shaft 113 formed with a flange 114 to which is secured a rotatable disc member 115. Speed-multiplying gearing interposed between the disc and the platen shaft includes a large gear 116 secured by a set screw 117 to the shaft 113, and a small gear 118 meshing with the gear 116 and being secured in any suitable manner to the platen shaft 6.

The disc 115 is formed with a plurality of circumferentially spaced notches 119, 120, 121, 122, 123, and 124, and with intervening smooth portions 119^a, 120^a, 121^a, 122^a, 123^a, and 124^a. The disc notches are adapted to be contacted by an oscillatable pawl for effecting complemental feeding rotation of the platen or cylinder 7. In the form shown, a lever 125 has a hub 126 mounting the lever for rocking or oscillation on the shaft 113, a screw 127 and the shaft flange 114 maintaining the lever against endwise movement on the shaft. A spring 128 coiled about the bushing 112 and having its ends anchored, respectively, by a screw 129 on the plate 110 and a post 130 on the lever 125 urges the lever in a clockwise direction as viewed in Figure 12. A pawl 131 pivoted on the lever as at 132 is urged toward engagement with the disc 115 by a spring 133 connected between an arm 134 on the pawl and a post 135 on the lever 125. A stop pin 136 carried by the supplemental end plate 110 is adapted to be received in a recess 137 formed in the pawl for holding the pawl free from contact with the disc 115, and at the same time yieldably holding the lever 125 against rocking.

To limit counterclockwise movement of the lever 125, i. e., to limit its sheet feeding or working stroke, a pin 138 is mounted in adjusted position on the plate 110 and is placed to be engaged by a curved portion 139 on the pawl, the arrangement being such that, when the lever 125 is rocked counterclockwise from the position shown in Figure 12, the pawl portion 139 will eventually engage the pin 138 so as to prevent further movement of the pawl and lever. In order that the stop pin 138 may be positioned adjustably, it is supported on an adjustable mounting plate 140 formed with arcuate slots 141 through which extend locking screws 142, the slots 141 being concentric with the axis of the shaft 113.

In operation, when the lever 125 is rocked counterclockwise, it will carry the pawl 131 bodily from the position shown in Figure 12 until the pawl moves clear of the pin 136, permitting the pawl nose to drop down into driving contact with the disc notch 119. Continued movement of the lever 125 will rotate the disc 115, gear 116, gear 118, and cylinder 7 to feed the work sheet a distance corresponding to a plurality of individual line-spacing increments, the number of such increments being dependent firstly upon the extent of the smooth, circumferential disc portion 124^a between the notches 124 and 119, and dependent secondly upon the number of individual line-spacing movements effected by rotating the shaft 6 and cylinder 7 following the preceding positioning of the disc 115 in the position shown in Figure 12. In accordance with the invention, the spacing of the disc notches and, consequently, the circumferential extents of the several intervening smooth portions differ from each other in dependence upon a desired sequence of work sheet feeding operations. The circumferential extent of the smooth intervening disc portion 124^a is such that, starting with the disc positioned as shown in Figure 12, a stroke of the lever 125, causing the pawl to drive the disc through contact with the notch 119, will rotate the cylinder 7 to position the work sheet for receiving a line of typing just twenty-four line spaces below the leading end of a web freshly inserted in the machine before the operation of the lever 125. Thus, it may be said that the smooth portion 124^a is dimensioned for a total web feed corresponding to twenty-four line spaces. The circumferential extents of the smooth portions 119^a, 120^a, 121^a, and 122^a are shorter than the extent of the portion 124^a. These shorter smooth portions are so dimensioned that, when the disc is rotated with the pawl in contact with any of the notches 120, 121, 122, or 123, the web will be fed an amount corresponding to twenty-one line spaces. The extent of the invening portion 123^a is such that, when the disc is advanced by the pawl's driving through the notch 124, the web will be fed an amount corresponding to twenty-four line-spacing increments.

It will be understood that, regardless of which of the disc notches is positioned to be engaged by the pawl when the lever 125 is rocked, the notch so positioned will be moved away from the pawl when the cylinder is line-spaced in individual increments by operation of the cylinder-rotating knob or combined line-spacing and carriage return lever. Consequently, during the first part of a stroke of the lever 125, the pawl will ride idly along the smooth disc portion trailing the particular notch. The complemental feeding effected with the pawl driving the disc will be more or less, depending upon the number of preceding individual line-spacing increments; but in each case the total feed, including the individual line-spacing increments and the final sweep feed, will be predetermined in accordance

with the extent of the smooth, peripheral portion in advance of the notch through which the disc is being driven.

Inasmuch as the total web feed accomplished following each stroke of the lever 125 varies, it is desirable that the parts be placed in predetermined starting positions, so that the sequence of feeding operations of the different extents will conform to the desired spacing of lines typed on the web. For assisting the operator in locating the parts in proper starting positions (the positions shown in Figure 12), registering marks on the frame and gear 116 are provided. In the form shown, the gear 116 is substantially enclosed by a housing 143 secured to the end plate 110 by screws 144. The front of the housing, i. e., the housing wall facing the operator, is formed with a sight opening 145 through which the gear 116 may be seen by the operator. The housing is provided with a marker 146 immediately adjacent the sight opening 145, and the gear 116 is provided with a marker 147 which is in registry with the housing marker 146 when the parts are in starting positions. The gear marker 147 may be made by forming a slit or groove along the top of one of the teeth so as to distinguish it from the other teeth of the gear.

The mechanisms disclosed herein embody the invention in the forms now preferred, but it will be understood that various changes may be made in the construction and relative arrangement of the parts without departing from the invention as defined in the claims.

We claim:

1. In a typewriter or the like machine, a frame; a sheet-feeding cylinder mounted for rotation thereon; line-spacing means for effecting individual line-spacing movements of the cylinder; and complemental spacing means operable following one or more individual line spacing operations for positioning a work sheet in a predetermined position irrespective of the number of the preceding individual line-spacing movements, said complemental spacing means comprising a disc in driving connection with the cylinder, a pawl, and means for oscillating the pawl bodily, the disc being provided with a plurality of circumferentially spaced driving contact portions adapted to be engaged and driven by said pawl, there being extended smooth circumferential portions intervening between adjacent radial portions and over which the pawl may slide idly, the lengths of extended smooth circumferential disc portions differing according to a desired sequence of complemental work sheet feeding operations.

2. In a typewriter or the like machine, a frame; a sheet-feeding cylinder mounted for rotation thereon; line-spacing means for effecting individual line-spacing movements of the cylinder; and complemental spacing means operable following one or more individual line-spacing operations for positioning a work sheet in a predetermined position irrespective of the number of the preceding individual line-spacing movements, said complemental spacing means comprising a disc in driving connection with the cylinder, a pawl, means for oscillating the pawl bodily, the disc being provided with a plurality of circumferentially spaced driving contact portions adapted to be engaged and driven by said pawl, there being extended smooth circumferential portions intervening between adjacent radial portions and over which the pawl may slide idly, a guide marker on said frame, and a guide marker movable in predetermined relation to movement of said disc and being adapted to register with said first named guide marker for indicating placement of the disc in a predetermined starting position.

3. In a typewriter or the like machine, a frame; a sheet-feeding cylinder mounted for rotation thereon; line-spacing means for effecting individual line-spacing movements of the cylinder; and complemental spacing means operable following one or more individual line-spacing operations for positioning a work sheet in a predetermined position irrespective of the number of the preceding individual line-spacing movements, said complemental spacing means comprising a disc in driving connection with the cylinder, a pawl, means for oscillating the pawl bodily, the disc being provided with a plurality of circumferentially spaced driving contact portions adapted to be engaged and driven by said pawl, there being extended smooth circumferential portions intervening between adjacent radial portions and over which the pawl may slide idly, the lengths of the extended smooth circumferential disc portions differing according to a desired sequence of complemental work sheet feeding operations, a guide marker on said frame, and a guide marker movable in predetermined relation to movement of said disc and being adapted to register with said first named guide marker for indicating placement of the disc in a predetermined starting position.

4. In a typewriter or the like machine, a frame; a sheet-feeding cylinder mounted for rotation thereon; line-spacing means for effecting individual line-spacing movements of the cylinder; and complemental spacing means operable following one or more individual line-spacing operations for positioning a work sheet in a predetermined position irrespective of the number of the preceding individual line-spacing movements, said complemental spacing means comprising a disc, a first gear rotatable by said disc, a second gear meshing with said first gear and being in driving connection with the cylinder, a pawl, means for oscillating the pawl bodily, the disc being provided with a plurality of circumferentially spaced driving contact portions adapted to be engaged and driven by said pawl, there being extended smooth circumferential portions intervening between adjacent contact portions and over which the pawl may slide idly, a guide marker on said frame, and a guide marker on said first gear adapted to register with said first-named guide marker for indicating placement of said disc in a predetermined starting position.

5. In a typewriter or the like machine, a frame; a sheet-feeding cylinder mounted for rotation thereon; line-spacing means for effecting individual line-spacing movements of the cylinder; and complemental spacing means operable following one or more individual line-spacing operations for positioning a work sheet in a predetermined position irrespective of the number of the preceding individual line-spacing movements, said complemental spacing means comprising a rotatable member in driving connection with said cylinder, a pawl, means for oscillating said pawl bodily, the rotatable member having a plurality of circumferentially spaced driving contact portions adapted to be engaged by said pawl, there being extended circumferential portions intervening between adjacent driving contact portions and over which the pawl may

slide idly in both directions, the lengths of the extended circumferential portions differing according to a desired sequence of complemental work sheet feeding operations, a housing carried by said frame, a sight opening in said housing, and a mark rotatable in predetermined relation to said rotatable element and within said housing but being visible through said sight opening only when said cylinder and said rotatable element are in predetermined positions for the starting of the desired sequence of complemental work sheet feeding operations.

6. In a typewriter or the like machine, a frame; a sheet-feeding cylinder mounted for rotation thereon; line-spacing means for effecting individual line-spacing movements of the cylinder; and complemental spacing means operable following one or more individual line-spacing operations for positioning a work sheet in a predetermined position irrespective of the number of the preceding individual line-spacing movements, said complemental spacing means comprising a disc, a first gear fixed to said disc to rotate therewith, a second gear meshing with said first gear and being drivingly connected to said cylinder, a lever oscillatable about the axis of rotation of said disc, a pawl carried by said lever, said disc having a plurality of circumferentially spaced notches cooperable with said pawl and extended smooth circumferential portions intervening between adjacent notches and over which the pawl may slide idly, the lengths of extended smooth circumferential portions being in accordance with a desired sequence of complemental work sheet feeding operations, a housing on said frame substantially covering said first gear, a sight opening in said housing, a mark on the housing adjacent the sight opening, and a mark on said first gear adapted to be seen through said sight opening in registration with said housing marker when said disc is in position for cooperation of a predetermined one of said notches with said pawl.

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