

Sept. 11, 1934.

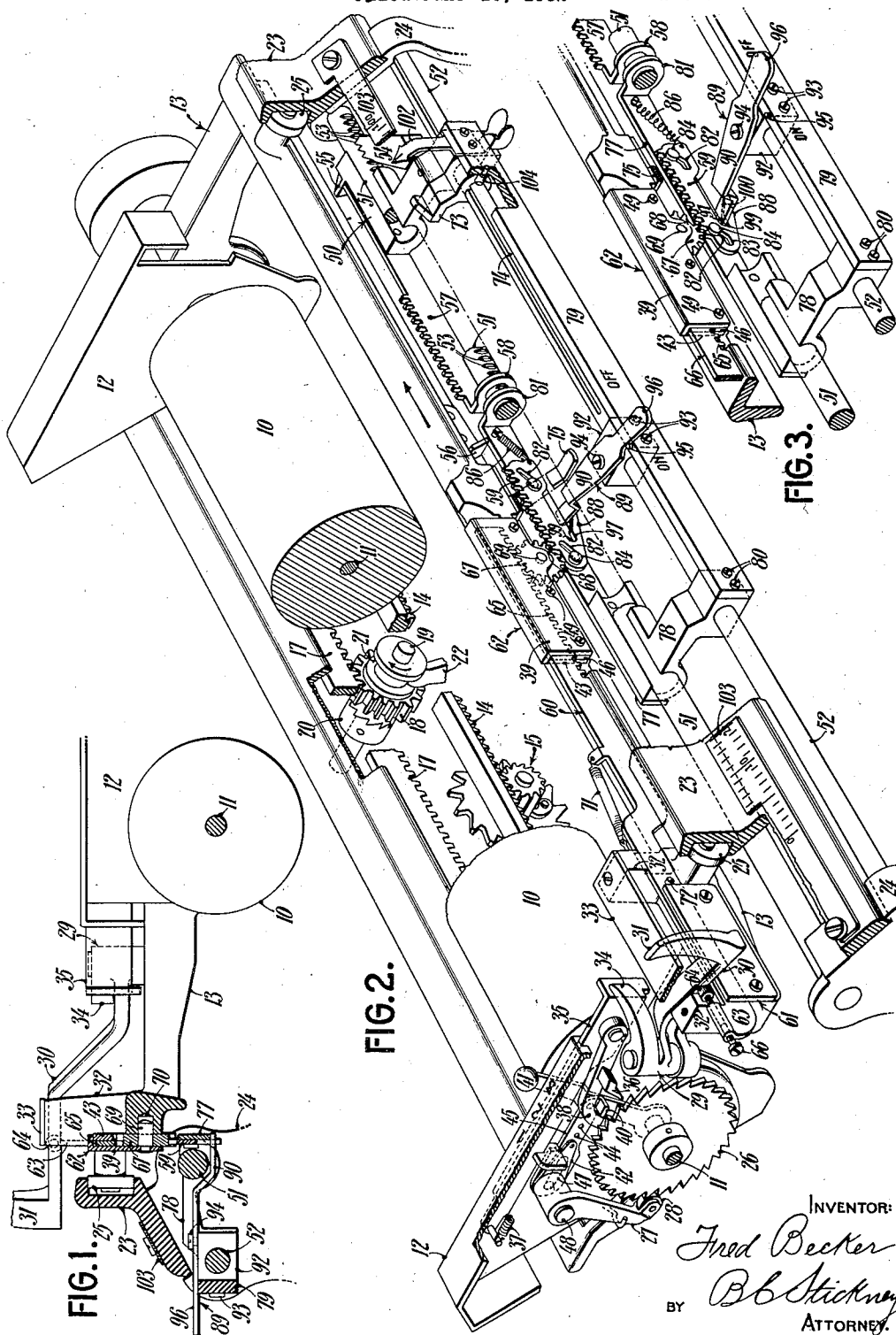
F. BECKER

1,973,036

TYPEWRITING MACHINE

Filed June 16, 1932

2 Sheets-Sheet 1



INVENTOR:

Fred Becker
BY B. B. Stickney
ATTORNEY.

Sept. 11, 1934.

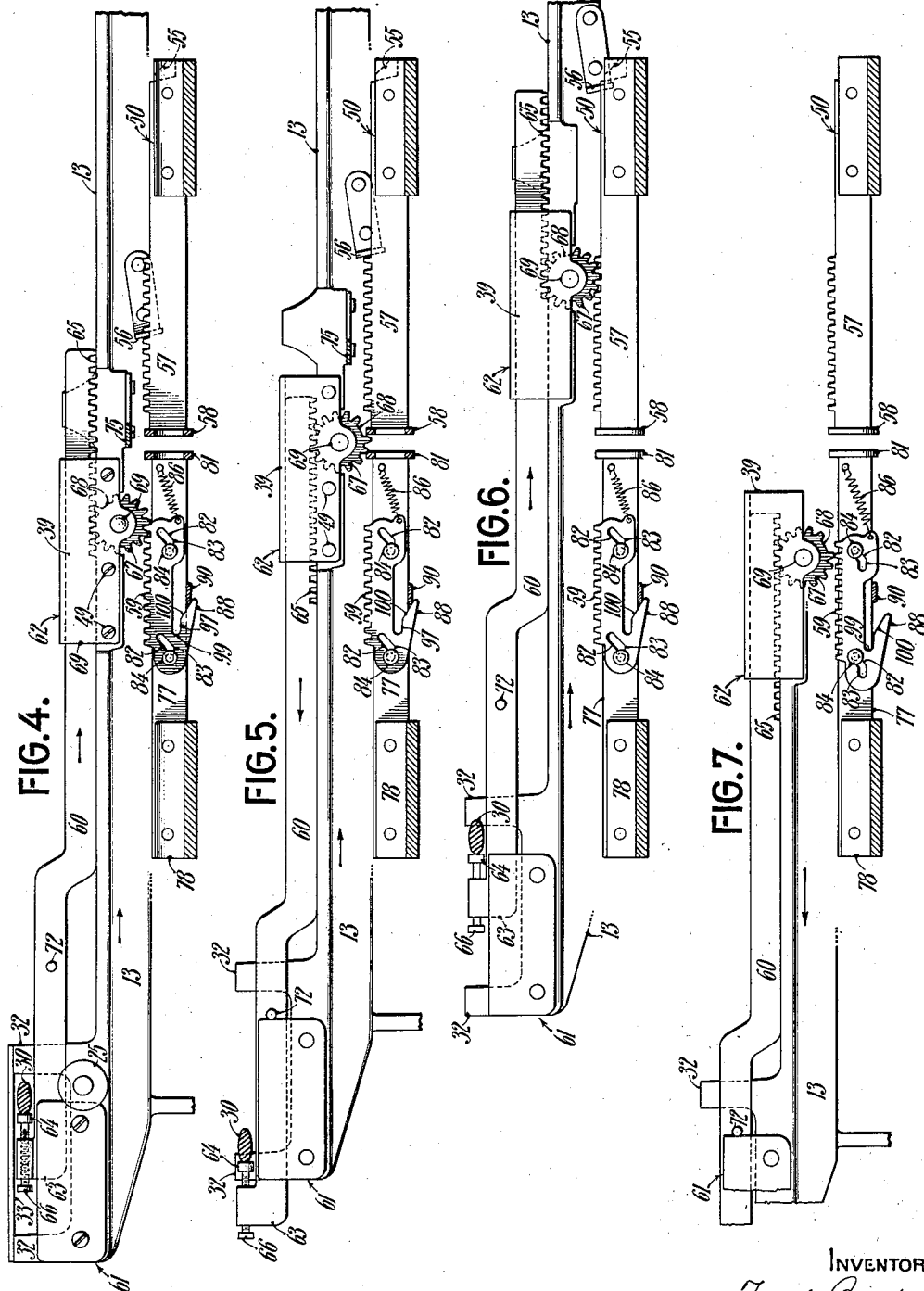
F. BECKER

1,973,036

TYPEWRITING MACHINE

Filed June 16, 1932

2 Sheets-Sheet 2



INVENTOR:

Fred Becker
By Stickney
ATTORNEY.

UNITED STATES PATENT OFFICE

1,973,036

TYPEWRITING MACHINE

Fred Becker, Queens Village, N. Y., assignor to
Underwood Elliott Fisher Company, New York,
N. Y., a corporation of Delaware

Application June 16, 1932, Serial No. 617,575

21 Claims. (Cl. 197—120)

This invention relates to automatic line-spacing mechanism for typewriters, and provides for line-spacing of greater extents than the double or triple spacing which the usual line-spacing mechanisms afford.

A feature of the invention resides in obtaining the extra wide spacing by automatically repeated operation of the regular line-spacing mechanism.

The device is particularly useful in typing certain reports, as, for example, stockholders' lists, in which the separate accounts are spaced vertically of the sheet, say about one inch apart, in order to afford, in one column, room for the customer's name, address and other data, all initially typed in lines, one above the other, in the vertical space allotted for each account. In side columns, there are typed from time to time, subsequently to the initial typing of all the customers' names, single-line entries, such as number of shares held, amount of dividends, or other data.

When typing these single-line entries for the several accounts on a sheet, it is necessary, considering the aforesaid illustrative one-inch spacing between accounts, to line-space the platen six line-space units after each entry, each unit being of a standard width of one-sixth of an inch. In the Underwood bookkeeping machine which handles this class of work, the line-spacing operation takes place automatically during the power-driven return of the typewriter-carriage.

In carrying out the present invention for extra width line-spaces, it is contrived to use the means whereby the power-driven return stroke of the Underwood carriage operates the line-spacing mechanism at the end of said carriage-return stroke, said means being set forth in Patent No. 1,262,604, to Walsleben, dated April 9, 1918. The line-spacing mechanism proper is of the type set forth in Patent No. 1,360,747, to Helmond, dated November 30, 1920, and includes the usual line-space lever at the left of the carriage-frame. As set forth in said Patent No. 1,262,604, there are mounted on the carriage-frame a rack, extending in the direction of the carriage-run, and a pinion, the rack having abutting connection with the line-space lever-arm, so that when said rack is moved endwise to the right, the line-space lever is also moved, the abutting connection permitting independent use of the line-space lever. The pinion meshes with the rack and travels along with the carriage. As the carriage nears the end of

its return movement the pinion encounters the end of a stationary rack and rides into mesh therewith, said stationary rack also extending in the direction of the carriage-run, on the side of the pinion opposite the carriage-rack. As the carriage proceeds toward the end of its return stroke, said pinion, now meshing with the stationary rack and being rotated by the movement of the carriage, imparts a corresponding movement to the rack on the carriage that engages the line-space lever, and consequently imparts a line-spacing stroke to the latter.

The stationary rack is mounted on the usual right-hand margin-gage which is adjustable laterally for different line-end positions. Said margin-gage also has associated therewith means for automatically terminating the power-driven carriage-return movement according to the line-end position established by said gage. The line-spacing connections, namely, the aforesaid racks and pinions, are so arranged that the stroke of the line-space lever is completed at about the time the carriage-return movement is completed.

To provide for automatically repeated line-space strokes, it is contrived to place in tandem with the aforesaid stationary rack, movable with the right-hand margin-gage, an additional stationary rack, the two racks being spaced apart, endwise, from one another. Thus it will be seen that, in the carriage-return movement, the line spacing pinion on the carriage encounters two racks in succession. There is first effected a line-spacing stroke by means of the first rack engaged by the pinion, then a self-retraction of the parts as the pinion traverses the space separating the two racks, and then an additional line-space stroke as the pinion encounters and runs along the next rack.

By setting the multiple line-space-unit adjuster for triple-unit spacing, there is thus provided by reason of the double stroke of the line-space lever a total line-spacing of the six units required in the aforesaid illustrative example. A total spacing of four units may be obtained by setting said adjuster for double-unit spacing.

A further advantage resulting from repeated operation of the line-space mechanism is that the wide line-spacing operation is done in easy stages, and there is therefore less tendency of the work-sheets to creep than if they were jolted ahead through a quick, large single rotation of the platen.

At the end of the return carriage-run, the aforesaid carriage-pinion may remain as hereto-

fore in mesh with the lastly-engaged stationary rack, the carriage-rack and line-space lever also remaining in advanced position. During the initial part of the movement of the carriage from the margin-gage in advance, that is, letter-feeding direction, the carriage-pinion and carriage-rack are moved reversely as the pinion rolls over the stationary rack, this reverse movement permitting the line-space lever and associated parts including the carriage-rack to return to normal position. Upon further movement of the carriage in letter-feeding direction, the pinion will encounter the first, that is, the additional stationary rack. Inasmuch as said pinion and the carriage-rack have already assumed their normal position, and are, therefore, incapable of further movement, it is contrived to mount said additional stationary rack so that it is automatically moved out of the path of the pinion as the latter encounters the same. Such mounting means for diverting the first stationary rack are also arranged so that said rack may be diverted manually at will. This is useful when instead of a repeated line-space operation during the carriage-return stroke it is desired to have a single-line-space operation. The means for throwing the stationary rack out of operative position may also be used to advantage with the single stationary rack heretofore employed, as, for example, when, in the case of very short carriage-runs, it is desired to line-space and return the carriage manually.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a sectional side elevation, of part of the typewriter-carriage and of the adjacent typewriter-frame, showing the arrangement of the line-spacing racks and pinion.

Figure 2 is a perspective view of the typewriter-carriage, showing the regular line-spacing mechanism in relation to the organization of the present invention.

Figure 3 is a perspective view, showing how the line-space stationary rack may be shifted out of effective position by a manual control.

Figures 4, 5, 6 and 7 are views looking at the front of the carriage, showing different phases in the operation of the invention. Figure 4 indicates the carriage at that point of its return movement at which the first line-space stroke has been completed. Figure 5 indicates how the line-space lever, after the first line-space stroke, has returned to its normal position during the interval the line-spacing pinion on the carriage traverses the space between the stationary racks. Figure 6 indicates the completion of the second line-space stroke, the carriage having completed its return movement and the line-spacing pinion having been driven by the second stationary rack. Figure 7 indicates how the carriage moving in letter-feed direction is enabled to proceed past the first line-space rack, because said rack is so mounted as to be pushed aside by the line-spacing pinion as said carriage so proceeds.

Referring to Figure 2, a typewriter-platen 10 is fastened to an axle 11 revolubly mounted in end members 12 of the usual case-shifting frame carried in letter-feeding carriage 13. It will be understood that there may be the usual feed-rolls (not shown) to co-operate with the platen to feed the work-sheets. Said carriage is propelled in letter-feeding direction by the usual spring-motor (not shown), the letter-feeding

steps being controlled by means of the Underwood escapement-rack 14 co-operating with the usual escapement-devices 15. Means for returning the carriage by power may be of the type set forth in Patent No. 1,238,919, to Hoyt, dated September 4, 1917, and are conventionally represented by a rack 17 fastened to and extending lengthwise of the carriage. Meshing with said rack 17 is a pinion 18 slidable axially on a power-driven shaft 19, so that it may be moved into and out of engagement with a toothed clutch-member 20, fastened to said shaft 19. Said pinion 18 is provided with a groove 21, in which there plays the end of an arm 22 of a spring-pressed lever normally latched in such position by latching means (not shown) that the pinion 18 is in a position in which it is disengaged from the clutch-member 20. Said latching means are tripped by means of a manually-operable key and also by carriage-controlled devices, all as set forth in said Hoyt patent. Figure 2 indicates the pinion 18 in engagement with the clutch-member 20 and rotating and moving the carriage in the direction of the arrows.

The carriage runs upon a front track 23 supported on side members 24 of the typewriter-framework, the carriage having rolls 25 running in said track. A rear carriage-rail (not shown) also supports and guides the carriage.

The usual line-spacing mechanism includes a toothed line-space wheel 26 fastened to the platen-shaft. A co-operating spring-pressed detent-arm 27 carries a roll 28 which seats itself in the tooth-spaces of the line-space wheel 26 to hold the platen. A line-space lever 29 pivoted at the left end of the carriage-frame 13 has a forwardly-extending arm 30 provided with a finger-piece 31. The swing of said line-space lever 29 is limited by abutments 32 rising from the carriage-frame 13 and topped by a cover-plate 33. Extending sideways of the arm 30 of the lever 29 is another arm 34 whereby said lever operates a slide 35 which serves to carry the line-space pawl 36. Said slide 35 is slidably retained in the end member 12 of the platen-frame and is urged forwardly to its normal position by a spring 37, which also serves to keep the line-space lever 29 in its normal position. The stroke of said line-space lever 29 and of the slide is uniform irrespective of rotating the platen through one, two or three line-space units. For determining the number of units through which the platen is to be rotated at each stroke of the lever 29, means are provided to control the engagement of the line-space pawl 36 with the line-space wheel 26. That is to say, said pawl normally withdrawn from said wheel 26, to permit independent rotation of the platen, is made to drop into said wheel at different points in the stroke of the slide 35. To this end the line-space pawl 36 has the usual cam-shaped end 38 reacting against a projection 40 extending from the side of the settable arm 41.

With the position of the arm 41 set as indicated in Figure 3, the mechanism is set for rotating the platen three line-space units upon the full stroke of the line-space lever 29. It will be seen that with this setting, the line-space pawl will engage the wheel 26 almost as soon as the slide 35 starts to move, because the projection 40 is in such position as to permit the immediate drop of said pawl 36. It will also be seen that if the projection 40 is moved rearwardly, there will be an idle portion at the beginning of the stroke of slide 35, the extent of

the idle portion depending on the position of said projection 40, and determining the number of tooth-spaces the line-space wheel is advanced. The usual provision is made for setting the lever 41 and its pawl-controlling projection 40 at three stations corresponding to single, double, and triple spacing. To locate said lever 41 in any one of said three stations, there is provided a stationary spring-detent 42 formed to engage detent-depressions 44 in the side of a slide 45. One end of the detent-slide 45 is pivoted to and supported by the lever 41, the other end of said slide 45 being slotted at 47 so as to be guided and supported upon a stud 48 that supports the detent-arm 27.

The usual right-end margin-gage 50 is slidable along guide-rods 51, 52 to adjust the extent of the carriage-run. The guide-rod 51 has a series of letter-spaced locating notches 53 into which there seats itself a correspondingly formed spring-pressed retractible arm 54 which is swingably mounted upon the margin-gage 50. Said margin-gage carries an abutment 55 against which a corresponding abutment 56 on the carriage strikes to limit the rightward, that is, the return movement of said carriage. Due to the usual properties of the escapement-mechanism, the carriage has a drop-back movement of between one and two letter-spaces after striking the abutment 55. Fastened to a rear vertical face of the margin-gage 50 is a rack 57, one end of said rack being fastened to said face, the rack, itself, projecting to the left of the gage in accordance with the arrangement of the parts and being bent over at a right angle at its outer end to form an ear 58 slidably fitting the guide-rod 51.

Another rack 59 is placed ahead of the rack 57 in tandem relation thereto and is spaced endwise from the latter as seen in the drawings, so as to form with said latter rack 57 two series of rack-teeth separated by a substantial gap. As will be described further on, said other rack 59 is also connected to the margin-gage 50 so as to be shiftable therewith.

Co-operating with the racks 59, 57 for actuating the line-space mechanism during a return movement of the carriage, there is mounted on said carriage an elongate rack-member 60 slidably retained by means of guiding devices 61, 62 mounted upon the carriage 13. The left end of said member is turned up at 63 to carry an adjustable screw-stud 64 whose projecting head forms an abutting connection with the arm 30 of the line-space lever. A lock-screw 66 abuts the inner end of the screw-stud 64 to hold the latter in adjusted position. At the other end of said elongate rack-member, there is a rack 65 with which there meshes a pinion 67 rotatably mounted on a stud 69, Figure 1, projecting from an outer cover-plate 39 of the guide 62, the outer end of said stud being received in a hole 70, Figure 1, of the carriage-frame for support. The cover-plate 39 is bent at a right angle to overtop the rack 65 and a rear wall-plate 43 of the guide 62. Underlying the rack 65 is a spacer-plate 46, which together with the plates 39 and 43 is secured to the carriage by screws 49. The racks 59, 57, 65 are so arranged that the pinion 67, during the course of the carriage-movement, may mesh with the teeth of the racks 59, 57. Figure 2 shows the carriage at that point of its return movement where the pinion 67 is about to be rotated by means of the first stationary rack 59, it being understood that pre-

vious to the carriage reaching said point, the pinion 67 was at the left and free of said first stationary rack 59. As the carriage then continues in its return movement the pinion 67, now meshing with the rack 59, is rotated clockwise, thereby drawing the elongate rack-member 60 to the right and imparting a line-space stroke to the line-space lever 29. The length of the first stationary rack 59 is such that the line-space lever will have been given its full advance stroke when the pinion 67 escapes from said rack.

As the pinion 67 escapes from the stationary rack 59 the parts of the line-spacing mechanism on the carriage will be returned to their normal positions by the pull of the extended springs 37 and 71, the latter spring pulling upon the elongate member 60 and the former spring 37 pulling the slide 35 forwardly again. A stop-pin 72 projecting from the elongate rack-member 60 abuts the guiding device 61 to limit the movement and establish the normal position of said rack-member 60 by the spring 71. In said normal position a toothless gap 68 of the pinion 67 facilitates engagement of said pinion with the racks 57, 59. In this restoration of the parts, the pinion 67 will be rotated counterclockwise. This restoration of the parts takes place in that portion of the carriage-return movement in which the pinion 67 traverses the gap separating the stationary racks 59 and 57. The line-spacing-mechanism parts having thus been restored during this interval, it is ready for another line-spacing operation which takes place as the pinion 67 encounters and rides over the stationary rack 57. As the pinion 67 thus rides over the rack 57 and thereby rotates, the elongate rack-member 60 is again drawn toward the right to operate the line-spacing mechanism. The parts are so proportioned that the line-space lever 29 will again have received its full stroke when the stop 56 on the carriage meets the abutment 55 on the margin-gage.

Assuming that the carriage is being returned by power through engagement of the carriage-returning pinion 18 with the power-driven clutch-member 20, there takes place, just before the carriage-stop 56 meets the margin-gage abutment 55, a withdrawal of said carriage-returning pinion 18 from the power-driven clutch-member 20. For effecting said withdrawal and thereby terminating the power-driven carriage-return movement in timed relationship to the positions of the margin-gage 50, there is disposed alongside of the latter, so as to be shiftable therewith, to any of said positions, a release dog 73, splined to the rotatable guide-rod 52 by means of a slot 74 extending along said rod. The rotation of said dog 73 rotates the guide-rod 52 to operate a linkage (not shown), for actuating the arm 22 to withdraw the carriage-returning pinion 18 from the power-driven clutch-member 20, said linkage being fully described in the aforementioned patent to Hoyt. For rotating the rod 52, the carriage carries the usual tappet 75 which cams down the rearwardly-projecting end of the dog 73 just before the carriage strikes the margin-gage abutment 55. After striking said abutment, the carriage drops back from one to two letter-spaces as aforesaid.

The carriage is now in its normal line-beginning position, the elongate member 60 and the line-spacing mechanism operated thereby being in advanced position, as indicated in Figure 6, it being noted, however, that, in said Figure 6, 350

the carriage is shown as not yet having dropped back the one to two letter-spaces. Even after such drop back the rack-member 60 and the line-space mechanism will still be in substantially advanced position. As the carriage hereafter moves in letter-feeding direction the line-spacing parts will reassume their normal positions in response to the counterclockwise rotation of the pinion 67 as the latter rides to the left along and in mesh with the stationary rack 57. The parts will have completed their return to normal position when said pinion 67 moving leftward escapes from the rack 57. In the continued leftward movement of the carriage, the pinion 67 will encounter the other stationary rack 59. Inasmuch as said pinion 67 and elongate rack-member 60 connected thereto are now in their normal positions, further rotation of the pinion 67 is barred. However, to permit said pinion 67, in said continued leftward carriage-movement, to pass the stationary rack 59, the latter is mounted so that it may be pushed aside during said leftward movement.

To this end, the rack 59 is mounted upon the side of a bar 77 whose one end is fastened to the rear face of a block 78, which is slidable upon the guide-rods 51, 52, said block being generally similar to the body of the margin-gage 50 and being connected thereto and properly spaced therefrom by means of a bar 79 secured to said block 78 and said body of the margin-gage by screws 80. The other end of the rack-supporting bar 77 is bent at right angles to form an ear 81 slidably fitting the guide-rod 51 like the ear 53 of the stationary rack 57. For guiding and supporting the stationary rack 59 so that it may be moved aside from carriage-pinion 67, said rack has spaced, inclined slots 82 terminating at their lower ends in extensions 83 that are parallel to the direction of the carriage-movement. Projecting from the bar 77 are headed shoulder-studs 84 slidably fitting the rack-slots 82 and their extensions 83. A spring 86, anchored to the bar 77, urges the stationary rack 59 toward the right; so that normally the left ends of the slot-extensions 83 abut the shoulders of the studs 84 to locate said rack 59.

It will be evident from Figures 2 and 4 that the slot-extensions 83 parallel with the direction of carriage-movement serve to lock the stationary rack 59 in the position in which the latter meshes with the pinion 67. That is to say, the rack 59 cannot be separated from the pinion 67 by side-thrust as the latter is driven by said rack 59. In the advance movement of the carriage, that is, movement in letter-feeding direction, the stationary rack 59 is first moved to the left when the pinion 67 strikes the right end of said rack, this leftward movement being without any edgewise displacement due to the direction of the slot-extensions 83. Further movement of the stationary rack 59, however, is accompanied by a downward movement as the studs 84 meet the incline of the slots 82, so that, as seen in Figure 7, the tops of the teeth of the pinion 67 finally skip over and past the tops of the teeth of the stationary rack 59. When the carriage has proceeded far enough to the left, so that the pinion 67 is free of the stationary rack 59, the latter assumes its normal position again, indicated in Figure 2, under the pull of the spring 86.

The stationary rack 59 may also be pushed aside at will, so as to render it inoperative during the carriage-return movement, as, for ex-

ample, when it is desired to only operate the line-spacing mechanism once during such movement. The stationary rack 59 is accordingly provided with a tail 88 which may be formed as shown so that it may be acted upon by a finger-lever 89 having an arm 90 engaging said tail 88 and extending rearwardly and downwardly from a supporting block 92. Said block 92 may be attached to the rear side of the bar 79 by screws 93, and may be drilled to fit over the guide-rod 52, a screw 94 threaded into the block pivoting the finger-lever 89. The front face of the bar 79 may have the legends "On" and "Off" to indicate that the stationary rack 59 is in effective or ineffective position. For limiting the swing of the finger-lever 89 in one direction, the upper edge of the bar may have a stop-pin 95 against which an arm or finger-piece 96 of the finger-lever 89 abuts when said arm is swung to the left as indicated in Figure 2. It will be seen from Figure 2 that with arm 96 swung to the left to the "On" position, the arm 90 of said finger-lever is withdrawn from the tail 88 of the stationary rack 59, which accordingly assumes its effective position under the pull of the spring 86. Shifting the arm 96 of the finger-lever 89 to the right will cause the end of the arm 90 to move the stationary rack 59 to the left. In such leftward movement the stationary rack will also move downward by reason of the inclined slots 82. When the rack 59 has been moved thus toward the left and downward as far as it will go, the end of the arm 90 rests upon a top portion 97 of the tail 88, and it will be seen that the rightward swing of the arm 96 is limited by the abutment of the side of said arm 90 with the bottom of the notch 99 which forms said top portion 97. Said top portion 97 may interlock with the end of the arm 90 of the finger-lever 89 to thereby hold the stationary rack 59 in its ineffective position. The pivoting screw 94 for said lever 89 may yieldably bind the latter in frictional contact with the supporting block 92, thereby conducing to the stability of the rack 59 in its ineffective position and also conducing to the stability of said lever in its "Off" position. The tail 88 may have an inclined edge 100 along which the arm 90 of the finger-lever rides as said arm pushes the stationary rack 59 forward and downward. Figure 3 shows the finger-lever 89 adjusted to the "Off" position to render the stationary rack ineffective.

The right margin-gage proper is similar in construction to the usual Underwood margin-gage and carries a pointer 102 that co-operates with the usual scale 103 for facilitating the setting of said margin-gage, said scale being attached in the usual manner to the carriage-rail 23. For retaining the carriage-return release dog 73 in juxtaposition with the side of the margin-gage 50, there may project from the rear face of the bar 79 a pin 104, Figure 2, which engages the side of the dog 73.

Sometimes the carriage is returned in the usual manner, that is, by gripping the finger-piece 31 of the line-space lever 29 to move the carriage rightward. In such case, with the stationary rack 59 in effective position, the spring 71 acts to restore the elongate rack-member 60 when the pinion 67 has passed over said stationary rack 59. Otherwise, if the elongate rack-member were not so restored, the parts would jam when the pinion 67 encounters the stationary rack 57.

It will be noted that in the novel organiza-

tion, the line-spacing-mechanism proper may be of standard form. It will also be noted, therefore, that machines already in use may be easily and economically adapted for wide line-spacing by merely substituting, for the usual margin-gage having a single rack, another margin-gage having the novel multiple rack organization.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. The combination with a carriage, of a line-spacing device upon said carriage, including a rack which extends in the direction of the run of the carriage, a pinion upon said carriage meshing with said rack, a rack stationary relatively to the carriage movement, means mounting said stationary rack upon the machine-frame, so that it may be moved, transversely of its pitch-surface into and out of the path of the pinion, said stationary rack being effective to engage said pinion at the final portion of the return movement of the carriage and being keyed to the mounting means so that in its effective position it is positively sustained against the pinion thrust during line-spacing, and a manually-operable shifter for moving said stationary rack into and out of effective position at will.

2. The combination with a typewriter-carriage, of line-spacing mechanism thereon including a rack extending in the direction of the run of the carriage, a pinion on said carriage rotatable to draw said rack in line-spacing direction, a rack stationary relatively to the carriage movement for engaging said pinion during a certain portion of the return run of said carriage, said mechanism, carriage-rack, and pinion being spring-restored to normal position as said pinion leaves the stationary rack at the end of said portion of the carriage-return run, and means whereby said pinion is enabled to pass idly over the stationary rack, without moving said carriage-rack, during the advance movement of the carriage.

3. The combination with a typewriter-carriage, of line-spacing mechanism thereon including a rack extending in the direction of the run of the carriage, a pinion on said carriage rotatable to draw said rack in line-spacing direction, a rack stationary relatively to the carriage movement for engaging said pinion during a certain portion of the return run of said carriage, said mechanism and carriage-rack being spring-retracted to normal position as said pinion leaves the stationary rack at the end of said portion of the carriage-return run, and means yieldably mounting said stationary rack so that it is pushed aside by the pinion during the advance movement of the carriage.

4. The combination with a typewriter-carriage, of line-spacing mechanism thereon including a rack extending in the direction of the run of the carriage, a pinion on said carriage rotatable to draw said rack in line-spacing direction, and a rack stationary relatively to the carriage movement for engaging said pinion during a certain portion of the return run of said carriage, said mechanism and carriage-rack being spring-retracted to normal position as said pinion leaves the stationary rack at the end of said portion of the carriage-return run, said stationary rack being mounted so that it is spring-pressed into normal position from which it is pushed aside

by the pinion during the advance movement of the carriage.

5. The combination with a typewriter-carriage, of line-spacing mechanism thereon including a rack extending in the direction of the run of the carriage, a pinion on said carriage rotatable to draw said rack in line-spacing direction, a rack stationary relatively to the carriage movement for engaging said pinion during a certain portion of the return run of said carriage, said mechanism and carriage-rack being spring-retracted to normal position as said pinion leaves the stationary rack at the end of said portion of the carriage-return run, and means mounting and guiding said stationary rack for endwise and resultant sidewise movement, enabling said pinion, without rotating, to push said stationary rack aside during the advance movement of the carriage.

6. The combination with a typewriter-carriage, of line-spacing mechanism thereon including a rack extending in the direction of the run of the carriage, a pinion on said carriage rotatable to draw said rack in line-spacing direction, a rack stationary relatively to the carriage movement for engaging said pinion during a certain portion of the return run of said carriage, said mechanism and carriage-rack being spring-retracted to normal position as said pinion leaves the stationary rack at the end of said portion of the carriage-return run, means yieldably mounting said stationary rack so that it is pushed aside by the pinion during the advance movement of the carriage, and manually-operable means for so pushing said stationary rack aside to silence the operation of the line-spacing mechanism as effected by means of said stationary rack.

7. The combination with a typewriter-carriage, a platen, and line-spacing mechanism operable in individual strokes, of a settable margin-gage limiting the return movement of said carriage, and means carried by said margin-gage for operating said line-spacing mechanism by the movement of said carriage in the return run of said carriage, said means being settable for effecting one or a plurality of line-spacing strokes during said run.

8. The combination with a letter-feeding carriage, of a self-restoring reciprocatory line-spacing device upon said carriage including a rack which extends in the direction of the carriage travel, a pinion upon the carriage meshing with said rack, means to engage said pinion at spaced stages of the final portion of the return movement of the carriage and cause the pinion to be rotated repeatedly on its axis by the movement of the carriage during said final portion of its return movement, to thereby repeatedly actuate the line-spacing device, and a margin-gage adjustable to determine the position at which the carriage is stopped at the completion of its return travel, said means adjustable with the margin-gage whereby the line-spacing device will have been operated repeatedly when the carriage has been returned to said gage, said means arranged relatively to said pinion so as not to repeat operation of the line-spacing device by the advance movement of said carriage from said margin-gage and so as not to impede said advance.

9. In a typewriting machine, the combination of a carriage, a platen thereon, line-spacing mechanism including an operating lever, and a device for actuating said lever repeatedly, called

into play automatically by the carriage after the return movement of the latter is commenced, said device including a rack on said carriage connected to said lever, a pinion on said carriage to travel therewith and meshing with said rack, a plurality of stationary racks, aligned endwise and spaced apart, to successively mesh with said pinion and repeatedly rotate the same during the return movement of the carriage, and means whereby the carriage by its advance movement causes a stationary rack to be displaced from the path of the pinion while the latter in said advance movement passes said stationary rack.

10. In a typewriting machine, the combination of a carriage, a platen thereon, line-spacing mechanism including an operating lever, and a device for actuating said lever repeatedly, called into play automatically by the carriage after the return movement of the latter is commenced, said device including a rack on said carriage connected to said lever, a pinion on said carriage to travel therewith and meshing with said rack, a plurality of stationary racks, aligned endwise and spaced apart, to successively mesh with said pinion and repeatedly rotate the same during the return movement of the carriage, the pinion remaining in mesh, at the end of the carriage-return run, with the last stationary rack, said last stationary rack thereby effecting restoration of said mechanism during the initial part of the advance movement of said carriage, and means whereby the carriage in its further advance causes any stationary rack, other than said last rack, to be displaced relatively to the pinion to permit idle passage of the latter in said further advance.

11. In a typewriting machine, the combination of a carriage, a platen thereon, line-spacing mechanism including an operating lever, and a device for actuating said lever repeatedly, called into play automatically by the carriage after the return movement of the latter is commenced, said device including a rack on said carriage connected to said lever, a pinion on said carriage to travel therewith and meshing with said rack, and a plurality of stationary racks, aligned endwise and spaced apart, to mesh with said pinion and repeatedly rotate the same during the return movement of the carriage, said pinion remaining in engagement with the last stationary rack it engages at the end of the return movement of said carriage, means being provided whereby said pinion, during the advance movement of said carriage, overrides the other rack-teeth without rotation, inasmuch as the restoration of said line-spacing mechanism takes place as said pinion runs along said last-engaged rack and rotates at the beginning of said advance movement.

12. The combination with a traveling carriage having a revoluble platen, of a self-restoring reciprocatory line-spacing mechanism on said carriage including an operating pinion, a rack stationary relatively to the carriage for engaging said pinion at a certain portion of the return run of said carriage to thereby operate the line-spacing mechanism, means mounting said rack so that it is capable of a certain degree of endwise movement and a resultant edgewise movement for moving said rack into and out of the path of said pinion, said pinion passing beyond said rack in said carriage-return run, means normally causing said rack to be in meshing position preparatory to its engagement by the pinion in the return run of said carriage,

said pinion pushing said rack endwise and aside as it passes thereover in the advance movement of said carriage, and a manually-shiftable device to move and hold said rack out of effective position.

13. The combination with a traveling carriage having a revoluble platen, of a self-restoring reciprocatory line-spacing mechanism on said carriage, including an operating pinion, a pair of racks stationary relatively to the carriage movement, aligned endwise and spaced apart for repeated operation of said pinion, to thereby repeatedly operate the self-restoring line-spacing mechanism, means mounting said racks so that the last one engaged by said pinion in the carriage-return run is fixed, and so that the other rack is capable of a certain degree of endwise movement and a resultant edgewise movement for moving said other rack into and out of the path of said pinion, and means normally causing said other rack to be in meshing position, said pinion remaining in mesh with the said last-engaged rack, said line-spacing mechanism being therefore restored as the pinion runs over the latter rack at the beginning of the carriage-advance movement, said pinion pushing the other rack endwise and aside as it passes thereover in the continuation of said advance movement.

14. The combination with a traveling carriage having a revoluble platen, of a self-restoring reciprocatory line-spacing mechanism on said carriage, including an operating pinion, a pair of racks stationary relatively to the carriage movement, aligned endwise and spaced apart for repeated operation of said pinion, to thereby repeatedly operate the self-restoring line-spacing mechanism, means mounting said racks so that the last one engaged by the pinion in the carriage-return run is fixed, and so that the other rack is capable of a certain degree of endwise movement and a resultant edgewise movement for moving said other rack into and out of the path of said pinion, means normally causing said other rack to be in meshing position, said pinion remaining in mesh with the said last-engaged rack, said line-spacing mechanism being therefore restored as the pinion runs over the latter rack at the beginning of the carriage-advance movement, said pinion pushing the other rack endwise and aside as it passes thereover in the continuation of said advance movement, and a manually-shiftable device to move and hold said other rack out of effective position to eliminate repetition of the line-space stroke at will.

15. The combination with a traveling carriage having a revoluble platen, of a self-restoring reciprocatory line-spacing mechanism on said carriage, including an operating pinion, a margin-gage adjustable to different positions to limit the return movement of said carriage, a pair of racks mounted for movement with the margin-gage as the latter is shifted to different positions, said racks being stationary relatively to the carriage movement, aligned endwise and spaced apart for repeated operation of said pinion, to thereby repeatedly operate the self-restoring line-spacing mechanism, the rack last engaged by said pinion in the carriage-return movement being fixed, the other rack having a mounting which renders it capable of a certain degree of endwise movement and a resultant edgewise movement for moving said other rack into and out of the path of said pinion, and

means normally causing said rack to be in meshing position, said pinion remaining in mesh with the said last-engaged rack, said line-spacing mechanism being therefore restored as the pinion runs over the latter rack at the beginning of the carriage-advance movement, said pinion pushing the other rack endwise and aside as it passes thereover in the continuation of said advance movement.

16. The combination with a traveling carriage having a revoluble platen, of a self-restoring reciprocatory line-spacing mechanism on said carriage, including an operating pinion, a margin-gage adjustable to different positions to limit the return movement of said carriage, a pair of racks mounted for movement with the margin-gage as the latter is shifted to different positions, said racks being stationary relatively to the carriage movement, aligned endwise and spaced apart for repeated operation of said pinion, to thereby repeatedly operate the self-restoring line-spacing mechanism, the rack last engaged by said pinion in the carriage-return movement being fixed, the other rack having a mounting which renders it capable of a certain degree of endwise movement and a resultant edgewise movement for moving said other rack into and out of the path of said pinion, means normally causing said rack to be in meshing position, said pinion remaining in mesh with the said last-engaged rack, said line-spacing mechanism being therefore restored as the pinion runs over the latter rack at the beginning of the carriage-advance movement, said pinion pushing the other rack endwise and aside as it passes thereover in the continuation of said advance movement, and a manually-shiftable device associated with said margin-gage to move and hold said other rack out of effective position to eliminate repetition of the line-space stroke.

17. The combination with a letter-feeding carriage returnable by power, of a line-spacing lever upon said carriage, a rack on said carriage extending in the direction of the run of the carriage and operatively connected to said lever, a pinion upon said carriage meshing with said rack, a nontraveling rack over which said pinion runs, in the final portion of the carriage-return movement, to operate the line-spacing lever, and means readily setttable at will, whereby, for manual return of the carriage and concomitant line-spacing by means of said lever, co-operation of said racks and pinion is silenced, said means also setttable for restoring said co-operation.

18. The combination with a letter-feeding carriage returnable by power, and a reciprocatory

line-spacing mechanism on said carriage, of a pinion on said carriage rotatable in one direction to impart a forward stroke to said mechanism and rotatable in the opposite direction to a normal position, by the spring-driven return stroke of said mechanism, a margin-gage limiting the carriage-return movement, and means connected to said margin-gage to be adjusted therewith for engaging and thereby driving said pinion repeatedly, said margin-gage means including a plurality of racks, spaced apart endwise, said pinion engaging the racks successively in the return run of the carriage for repeated line-space operations and being therefore in said normal position while passing from one rack to another, means being provided whereby, with the pinion so restored, its advance with the carriage in letter-feed direction will not be impeded by any rack which the restored pinion passes in said advance.

19. In a typewriting machine, the combination with a carriage, and a reciprocatory line-spacer thereon, of a pinion on the carriage rotatable in one direction to operate said line-spacer, and reversely rotatable by self-restoration of the line-spacer, a plurality of racks in the path of the pinion to rotate the latter repeatedly, at spaced stages in the carriage-return run, to multiply the work-sheet movement, and means to automatically disable line-spacer-driving co-operation of a rack and said pinion as said pinion passes said rack in the advance movement of the carriage following said return run.

20. In a typewriting machine, the combination with a letter-feeding carriage returnable by power, of a line-spacing mechanism, and means brought into action by the return movement of said carriage at successive stages in its travel, to operate the line-spacing mechanism repeatedly, to multiply the movement of the work-sheet.

21. In a typewriting machine, the combination with a letter-feeding carriage, returnable by power, carrying a member operable for line-spacing, of a plurality of line-space controllers arranged in the path of said member to engage and repeatedly operate the latter at successive stages in the carriage-return movement to thereby multiply the line-space movement of the work sheet, said member passing said controllers again in subsequent letter-feeding advance of the carriage, means being provided whereby, in said re-passing of the controllers by said member, repeated operation of said member is avoided.

FRED BECKER.