May 3, 1932. H. E. ZERICK 1,856,612

TYPEWRITER LINE SPACER

Filed July 17, 1930 2 Sheets-Sheet 1

FIG. 1.

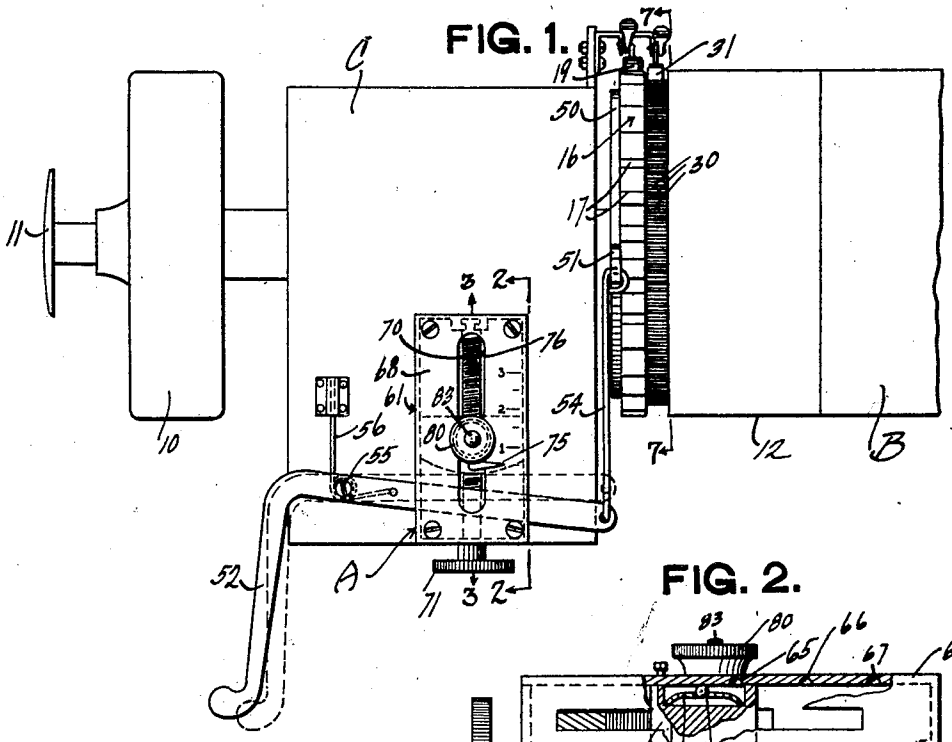

FIG. 2.

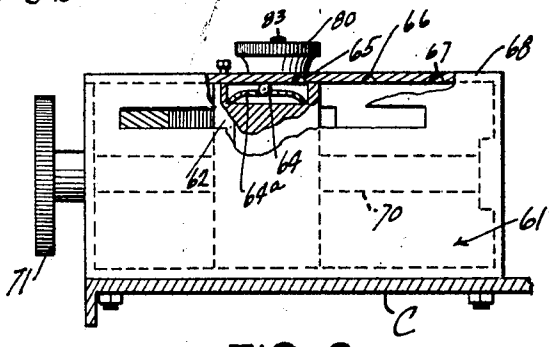

FIG. 5.

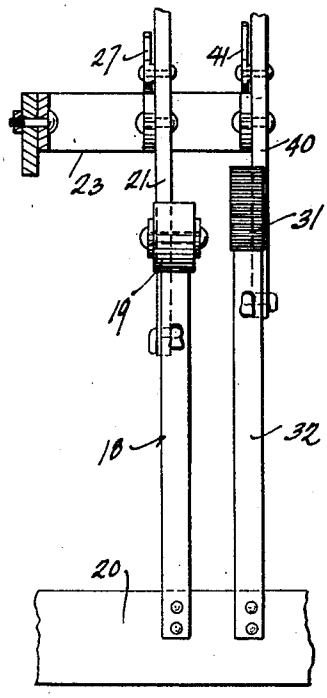

FIG. 3.

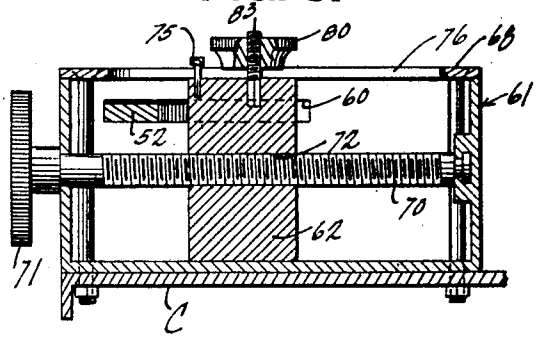

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FIG. 6.

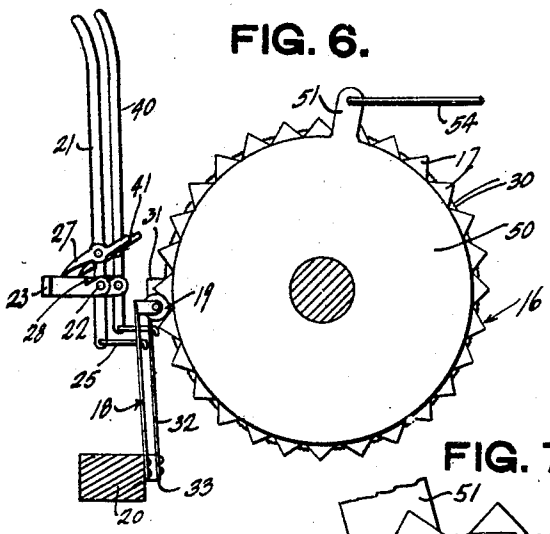


FIG. 4.

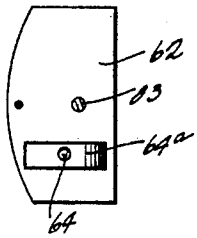
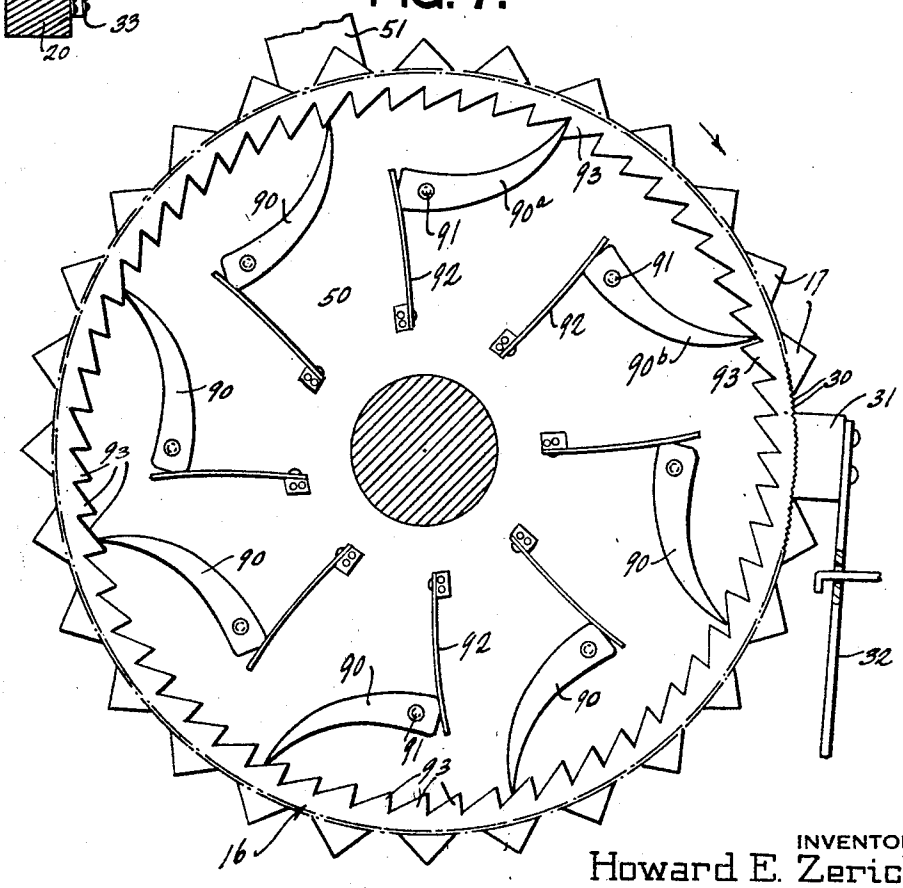


FIG. 7.



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UNITED STATES PATENT OFFICE

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TYPEWRITER LINE SPACER

Application filed July 17, 1930. Serial No. 468,620.

This invention relates to improvements in means for adjusting the line spacing of typewriting machines and the like, so that the line writing may be spaced according to conventional spacing or irregularly spaced with micrometer spacing variations.

The primary object of this invention is the provision of a relatively simple and practical type of line spacing mechanism which will permit single, double, or triple spacing of conventional character, and which will permit intermediate or fractional spacing in small fractional parts of a single space, such as one-eighth; the fractional part of the spacing of course being regulatable by improved means so that it may be increased or decreased as desired.

It is well known to typists that the conventional single, double, or triple spacing must sometimes be departed from. The fractional difference in spacing over regular single spacing may be very slight. It is therefore the purpose of this invention to provide means which will permit of an accurate line spacing which is capable of adjustment to line spacing in small fractional parts of regular spacing. With such device, the saving of time and expense is obtained, not only in those cases where it is desired purposely to depart from regular spacing, but in the typing of lined sheets whereon the lines are irregularly spaced from conventional typewriter spacing.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawings, wherein for the purpose of illustration is shown only a preferred embodiment of the invention,

Figure 1 is a fragmentary plan view of the improved line spacing device as attached to the platen and associated apparatus of a typewriter.

Figure 2 is a fragmentary side elevation of the adjusting mechanism of the line spacing attachment, the view being taken substantially on the line 2—2 of Figure 1.

Figure 3 is a longitudinal sectional view taken through the adjusting mechanism of Figure 2, substantially on the line 3—3 of Figure 1.

Figure 4 is a plan view of the stop block of the adjusting mechanism.

Figures 5 and 6 are fragmentary views, partly in section, showing the detent mechanism cooperatively related with the platen.

Figure 7 is an enlarged fragmentary sectional view, taken substantially on the line 7—7 of Figure 1, and showing more particularly the multiple pawl arrangement by means of which the platen may be regulated as to pitch of movement in a relation which will insure against lost motion and permit of a slight fractional part of the movement of a single space of an ordinary typewriter.

In the drawings, wherein similar reference characters designate corresponding parts throughout the several views, the letter A may generally designate the attachment, which is cooperatively related to any type of writing machine, such as a typewriter, billing machine, and the like, for the purpose of moving the roll or platen B, not only for conventional single, double, and triple line spacing, but also for additional intermediate fractional spacing.

The platen B is of course rotatably mounted upon the frame C of the machine, and its function is so well understood that it need not be further enlarged upon in this specification. The platen B is provided with a conventional hand grasping wheel 10, to enable handle manipulation of the platen B, and associated therewith is a clutch release handle 11 for releasing the clutch which is housed in the platen B at an end adjacent the location 12. This clutch cooperates with the spacing mechanism to render the same operative or inoperative with respect to the platen B, in a relation well understood in this art.

The platen B is provided with an end ring-shaped metal wheel generally designated at 16, which is hollow, and may be fixed with the platen B, and which of course cooperates with the clutch mechanism. This portion 16 is externally provided with an annular series of teeth 17 adjacently spaced as to pitch equal to a conventional single typewriter spacing. Cooperating with said teeth 17 is a spring

urged detent 18, having a roller 19 at an end thereof spring urged against the teeth and adapted to drop into the hollows therebetween to prevent free rotation of the platen and determine accurately the line spacing for which the typewriter is set. Of course the detent 18 is suitably mounted upon a portion 20 which is fixed to the frame of the typewriter. The detent 18 may be held inoperative, and to this end a lever 21 is provided, pivoted at 22 upon a portion 23 of the typewriting machine, and at the side thereof opposite the handle portion being connected by linkage 25 with the spring of the detent 18; a pawl 27 being provided upon the lever 21 and adapted to drop into a suitable notch 28 to hold the pawl roller 19 out of engagement with the teeth 17, when it is desired to utilize the improved variable line spacing adjustment of the invention.

The ring-shaped wheel 16 is also provided with an annular series of very fine teeth 30, which are practically nothing but serrations and minutely spaced and associated therewith is a detent block 31 having similar teeth or grooves for intermeshing with the teeth 30. The detent block 31 is mounted upon a spring 32, supported at 33 upon the frame 20. In cooperation with the portion 23 of the frame, a lever 40 is provided, having a pawl 41 associated therewith and cooperating with the spring 32 in the same manner as above described for the pawl 27, but for the purpose of inoperatively holding the detent block 31 if it is desired to use regular, single, double, or triple spacing.

Rotation of the platen B through the member 16 is accomplished by means of a pawl and ratchet mechanism consisting of a plate 50 rotatably supported upon the shaft of the platen, having pawl means therein cooperating with ratchet teeth on the internal periphery of the ratchet wheel or member 16, as will be subsequently described. The plate 50 has a radially extending arm 51 thereon, to which the bell-crank shaped spacing lever 52 is operatively connected through the intermediary of a connecting link or rod 54, as shown in Figure 1. The spacing lever 52 is pivoted at 55, upon the frame C of the machine, and is spring urged at 56 so that the link connected end of the lever normally is urged in a direction counter to the feed rotation of the platen. The lever between its pivot 55 and the link 54 operatively extends through a suitable slot 60 transversely provided through the housing 61 wherein the adjusting mechanism is mounted. This adjusting mechanism preferably consists of a stop block 62 longitudinally slidable in the housing 61, which is provided with a spring 64^a and ball detent 64 adapted to seat in any of the recesses 65, 66, or 67 provided in the top wall 68 of the housing 61, respectively to insure conventional single, double, or triple spacing. That is, if upon operation of the spacing lever with the block 62 positioned so that the ball 64 is in the recess 65, the end of the lever extending through the housing 61 will abut the stop block at a time when this movement of the spacing lever thru the pawl and ratchet mechanism has rotated the platen B for a single space of conventional dimension. This is similarly true for the recesses 66 and 67, which respectively determine the double and triple spacing movements of the platen.

In order that the stop block may be variably adjusted for less than a conventional single space or for fractional parts of a space intermediate single and double, or double and triple, I provide an adjusting screw 70 axially rotatable longitudinally through the housing 61, having suitable bearings therein and being provided with an external thumb engaging head 71; the same being screw threaded in a threaded opening 72 provided through the stop block 62. Upon rotation of the screw 70, the stop block is of course longitudinally moved to the desired position. The determination of the position is accomplished by means of a pointer 75, which extends upwardly through a longitudinal slot 76 in the top wall of the housing, and overlies the top surface of the top wall 68; the latter being provided with suitable graduations in designation of single, double, or triple spacing, or fractions thereof, as desired. The position of the stop block 62 is insured by means of a clamping nut 80, which is adjustably threaded upon a screw threaded stem 83 extending upwardly through the slot 76 to the top wall of the housing 61, as shown in Figure 3 of the drawings; the nut 80 being adjustable against the top wall 68 to insure a positioning of the stop block in the housing 61, against movement.

The pawl supporting plate is provided with a plurality of pawls 90 therein, preferably eight in number, the same each being pivoted at 91 thereon and being spring urged at 92 so that their pointed outer ends engage against the ratchet teeth 93 on the internal periphery of the ratchet wheel 16. The teeth 93 may be provided in any approved number, and they are provided in far greater number than the number of the teeth 17 on the external periphery of the ratchet wheel 16. In the example shown three of the teeth 93 are provided for a single pitch spacing between the teeth 17, although this number may be increased or decreased as found desirable according to the smallest micrometer adjustment which it is desired to obtain in the accomplishment of the variable line spacing. The pawls 90 are so arranged that the points thereof are in different relations with respect to the shoulders of the teeth 93. Thus, as shown in Figure 7, one of the uppermost pawls 90^a has its pointed end engaged

against a shoulder of one of the ratchet teeth 93, and is in effective position for causing a rotation of the ratchet wheel 16, and correspondingly of the platen B upon operation of the spacing lever 52. It will be noted that the next pawl 90[b] in the direction of rotation of the platen is placed about one-eighth of the pitch spacing of adjacent teeth 93 from the facing shoulder of the immediately forward tooth 93. This one-eighth spacing is successively increased for succeeding pawls 90, and by reason of this relative arrangement of the pawls 90 with respect to the ratchet teeth 93 of the shoulders thereof, it is insured that upon movement of the spacing lever 52 there will be no lost motion, but the motion thereof will be effectively transmitted, even fractional motion, to the ratchet wheel 16. In the illustration, assuming there are three of the teeth 93 to one of the teeth 17, and that the pawl spacing is such that only one pawl 90 will engage the shoulder of any one tooth 93 at a single time, it is quite apparent that the stop block 52 may be adjusted to enable the fractional spacing movement of the platen at fractions approximately 1/24th of the dimension of a conventional single space. However, with the mechanism illustrated it is quite obvious that this fraction may be made even less, or greater, as desired.

The operation of the improved attachment will be apparent from the foregoing. Assuming the device is to be adjusted to lined paper, whereon the line spacing is irregular, it is necessary to put the paper in the machine, and turn the platen until the first full line of the paper shows. The pointer on the sliding stop block 62 should then be positioned at the point indicating one standard single space or less. The handle of the spacing lever 52 is then pressed with the left hand, and with the right hand the micrometer screw 70 is rotated until the block 62 is in such position that the second line on the sheet will be in the same position that the first line originally occupied, with the lever 52 contacting against the stop block 62. The stop block may then be clamped in place, and the spacing mechanism has been adjusted to the irregular line spacing of the paper upon which the writing is to be done. The line spacing will be uniform on such sheet, according to the lining of the paper, as is quite obvious.

Of course, during the use of the irregular line spacing, the regular detent 18 is held out of position with respect to the ratchet wheel teeth 17, and the fine toothed or grooved detent block 31 is then effectively released to engage the teeth 30, in the position shown in Figure 7.

When regular line spacing is desired, the block 31 is held out of position with respect to the teeth 30; the detent 18 is placed in regular cooperative detent relation with the teeth 17, and the single, double, or triple spacing apparatus is used in a manner which will be quite obvious, and which is entirely conventional.

Various changes in the shape, size, and arrangement of parts may be made to the form of invention herein shown and described without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a writing machine the combination of a frame, a revoluble platen on the frame, a ratchet wheel movable with the platen, an external series of conventional spacing teeth and an internal series of ratchet teeth closer spaced together than the spacing of said spacing teeth, the ratchet wheel externally thereon having an external series of finely spaced teeth very materially closer spaced than the conventional teeth, independently operable detent means for the conventional spacing and fine teeth externally on said ratchet wheel, means to independently hold either of said detent means out of respective operation with the teeth, a plate independenly rotatable about the axis of the platen, a plurality of spring urged pawls mounted on said plate in an annular arrangement spring urged against the ratchet teeth and relatively arranged so that but one of said pawls is effectively in engagement with the ratchet teeth at any time and with successive pawls spaced successively increasing distances away from the shoulders of adjacent ratchet teeth, an operating lever mounted on said frame, means connecting the operating lever with said plate for movement of the same, a stop block for determining the movement of said lever, means mounting the stop block adjustably on the frame including an elongated adjusting screw for movement of the stop block along said screw, indicator means on the stop block for indicating the degree of movement thereof, and means to clamp the stop block in a fixed position relative to said frame.

2. In a writing machine the combination of a frame, a revoluble platen on the frame, a ratchet wheel movable with the platen having an external series of conventional spacing teeth and an internal series of ratchet teeth closer spaced together than the spacing of said spacing teeth, the ratchet wheel externally thereon having an external series of finely spaced teeth very materially closer spaced than the conventional teeth, independently operable detent means for the conventional spacing and fine teeth externally on said ratchet wheel, means to independently hold either of said detent means out of respective operation with the teeth, a plate rotatable about the axis of the platen, a plurality of spring urged pawls mounted on said plate in an annular arrangement spring urged against the ratchet teeth and relative-

ly arranged so that but one of said pawls is effectively in engagement with the ratchet teeth at any time and with successive pawls spaced successively increasing distances away from the shoulders of adjacent ratchet teeth, and adjustable stop means, cooperating with the plate, to gauge the extent to which the plate may rotate.

3. In a device of the class described the combination of a frame, a revoluble platen for the frame, operating means for moving the platen minute distances without lost motion, including a spacing lever operatively connected to said platen, and stop means mounted upon said frame, including a housing having a transverse slot in a side thereof and recesses in the interior wall of one side thereof, an adjusting screw axially rotatable longitudinally thru the housing, a stop block longitudinally slidable in the housing mounted upon said screw and movable therealong upon rotation of said screw, and a spring and detent carried by said stop block, the detent urged by the spring to seat in any one of said recesses to insure conventional single, double or triple spacing of said platen, said lever extending thru said slot into said housing and limited in movement in one direction by said slot and in the opposite direction by said block.

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