

May 16, 1933.

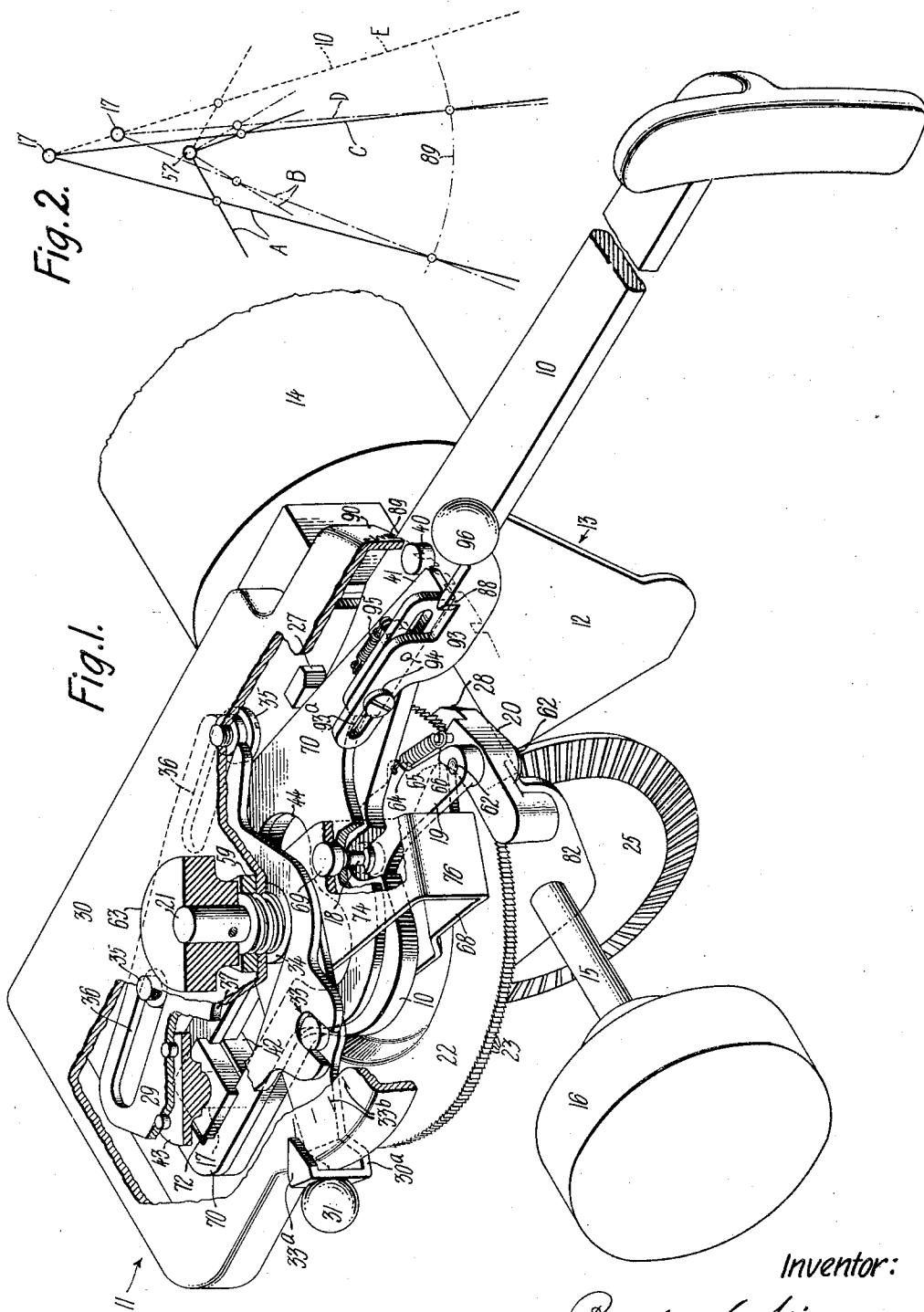
B. C. STICKNEY

1,909,908

TYPEWRITING MACHINE

Original Filed Jan. 17, 1930

3 Sheets-Sheet 1



Inventor:

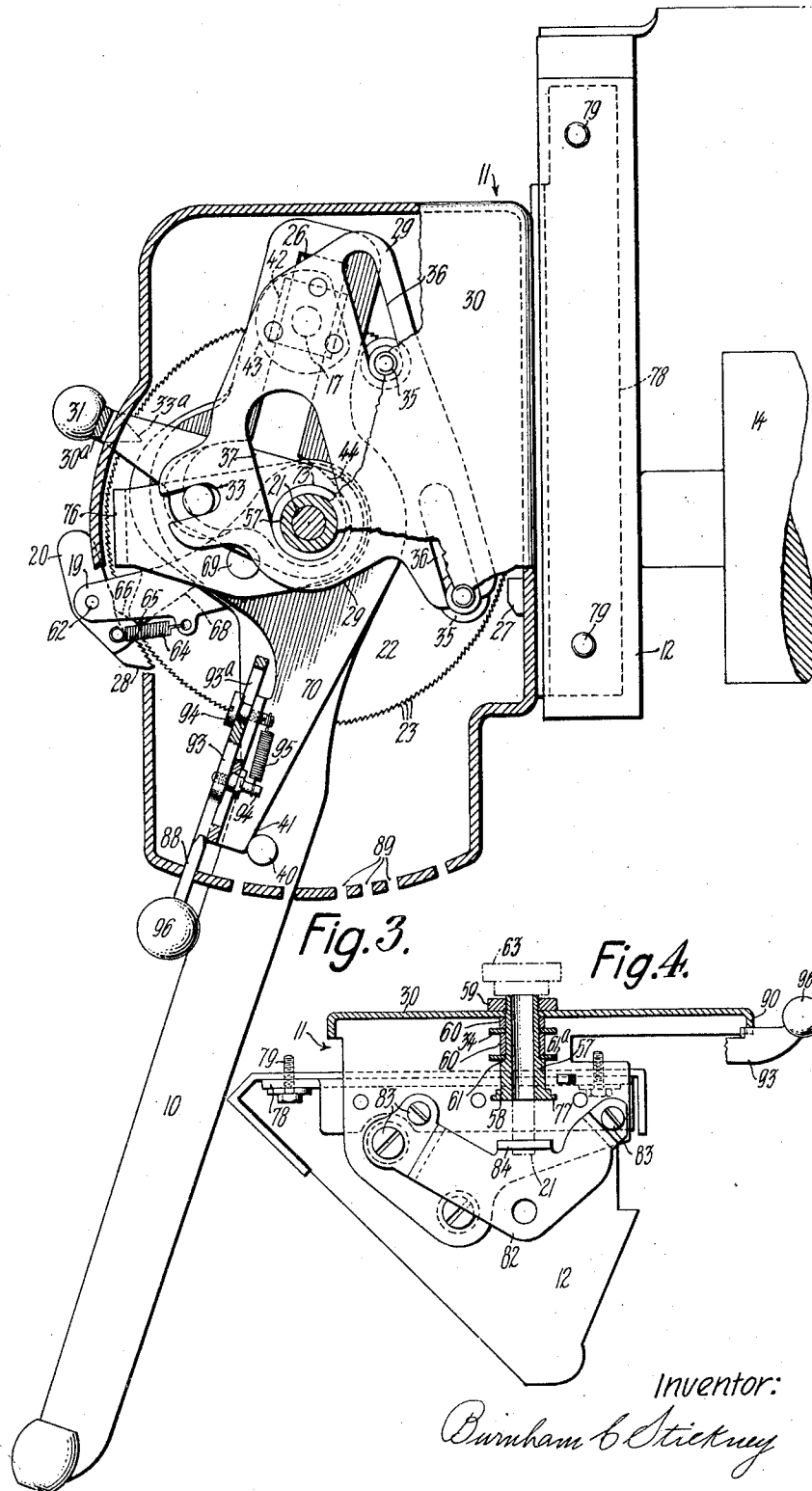
Burnham C. Stickney

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Original Filed Jan. 17, 1930 3 Sheets-Sheet 2



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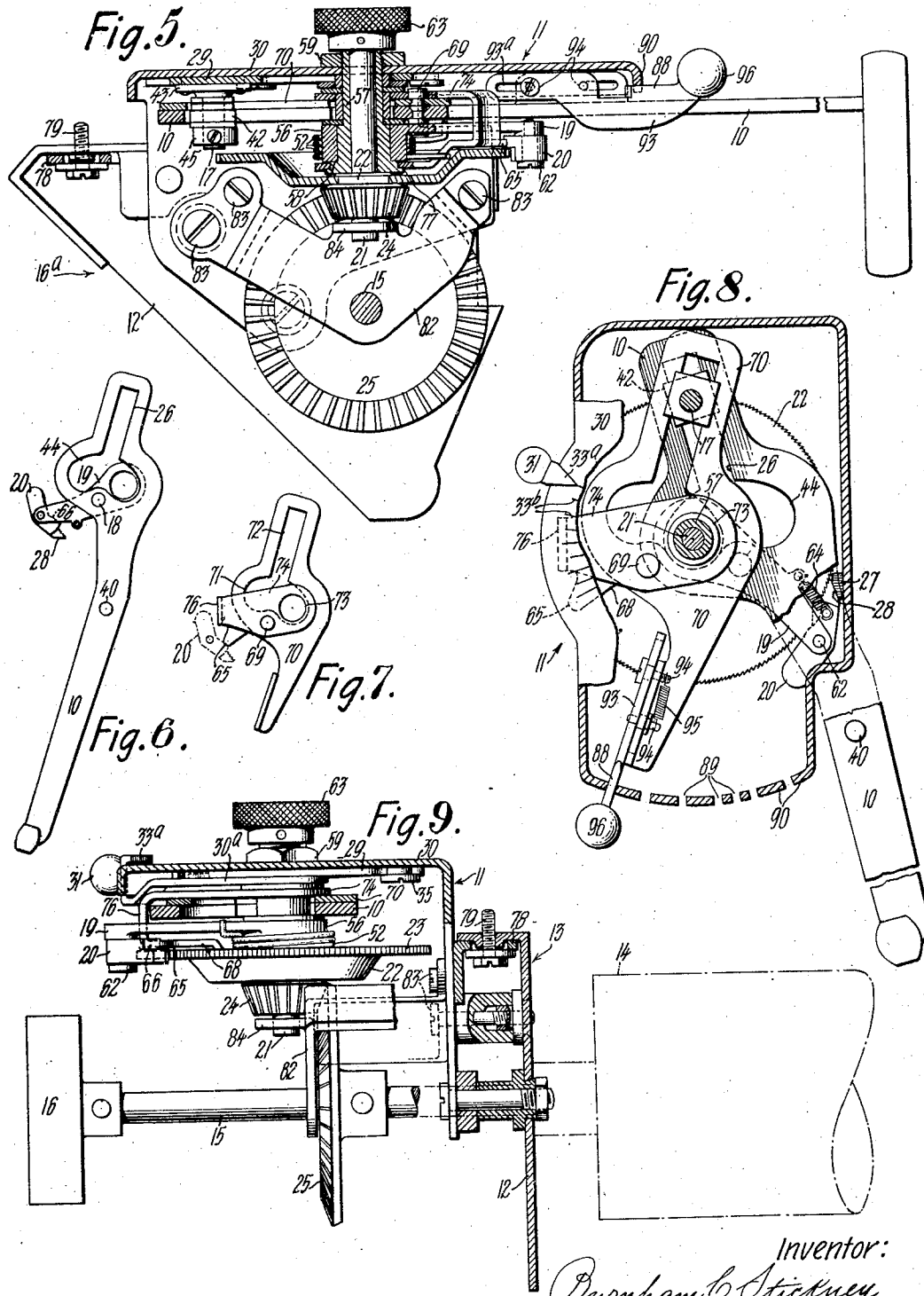
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3 Sheets-Sheet 3



Inventor:

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TYPEWRITING MACHINE

Application filed January 17, 1930, Serial No 421,348. Renewed November 21, 1931.

This invention relates to line-spacing mechanism of typewriting machines of the class in which minute variations of the line-space movement can be produced, and in which a line-space regulator can also be adjusted for spacing the required set number of line-space units at each stroke of the lever which returns the typewriter-carriage.

Upon the platen-axle is fixed a bevel gear, and meshing therewith is a small bevel pinion that is fixed upon a vertical main arbor, having a thumb-wheel at its top. Meshing with the pinion is a large gear that drives the platen. Also fixed upon the main arbor is a ratchet-wheel having a multitude of very fine teeth.

Concentrically with the ratchet-wheel is mounted a pivoted driving arm, which carries a pawl to drive said ratchet-wheel. Said pawl-driving arm is a lever of the third class.

The driving stroke of the lever is arrested by the engagement of the pawl with a fixed stop, which co-operates with the pawl to lock the ratchet-wheel and platen against overthrow.

A regulator-train may be set for one-half, one, one and one-fourth, one and one-half, two, two and one-half or three line-space units. The length of each line-space unit is determined by the setting of a fulcrum.

The regulator-lever has an adjustable fulcrum. The regulator-lever is pivoted upon the regulating arm, which, like said pawl-arm, is itself pivoted upon said vertical shaft.

This regulator-arm is formed with an interceptor-cam, which engages said pawl upon the completion of the return stroke of the line-space lever, and releases the same from the ratchet-wheel, thereby determining the length of the stroke of the ratchet-wheel and platen, and also leaving the ratchet-wheel free to be revolved idly with the platen when the latter is occasionally rotated, either by means of said vertical arbor and its thumb-wheel, or by means of the finger-wheels fixed upon projecting ends of the platen-axle.

By swinging the regulator-lever to any

desired point, and setting it there, the length of the stroke of the line-space lever may readily be predetermined. The regulator-lever is longitudinally slotted; and when the fulcrum is adjusted along the slot, subsequent adjustment of the regulator-lever to location for a given number of line-spaces, controls the subsequent motion of the line-space lever for driving the platen to the extent desired.

In the drawings, the line-spacing and carriage-returning lever is shown in the form of a lever of the second order, which is fulcrumed in rear of the vertical arbor of the line-space wheel. This renders it practicable to reduce the distance to which the lever extends forwardly of the platen. The finger-hold at the front of the lever extends only as far forwardly as is customary in Underwood standard typewriting machines; and the line-spacing mechanism, including the lever, is entirely mounted upon the up-and-down platen-shifting frame of said machines. The pivoting of the lever at the rear part of the device conduces to compactness, inasmuch as the slide upon which the fulcrum-pin of the lever is fixed may be mounted mainly at the rear part of the mechanism, away from the line-space-regulating train, which extends forwardly from the line-space-lever arbor. This arrangement conduces to accessibility as well as compactness and lightness. The height to which the mechanism rises above the platen-axle is substantially reduced, owing to the compactness which is secured by the pivoting of the line-space lever in rear of the vertical axis of the line-space wheel.

Said fulcrum-pin slide may be operated by means of a lever that is pivoted upon the vertical fixed shaft wherein is mounted the arbor of the line-space wheel. Said lever projects to the left, and is provided with a finger-piece, index and scale, and is compactly placed between the fulcrum-pin slide and a collar which is formed upon said vertical fixed shaft.

The line-space regulating train includes a lever which is fulcrumed upon an adjustable fulcrum-pin in rear of the line-space-wheel

arbor, and includes a forwardly-extending arm, upon which is mounted a latch. The latch or detent is engageable in any one of the notches of a rack, to locate the lever selectively for multiple and fractional line-spacing. The line-space lever may in some cases be arrested by said arm.

Other features and advantages will hereinafter appear.

10 In the accompanying drawings,

Figure 1 is a perspective view, partly broken away, showing the invention in one form.

Figure 2 is a diagram showing the strokes 15 of various members seen at Figure 1.

Figure 3 is a sectional plan of a form of the invention in which the line-space lever has a variable stroke, and is arrested by the adjustable regulator-lever, according to the 20 setting of the latter.

Figure 4 is a sectional side elevation, showing the brackets and fixed parts seen at Figure 3.

Figure 5 is a sectional side elevation of the 25 mechanism seen at Figure 3.

Figure 6 is a separate view of a line-space lever seen at Figure 3, together with the drive-arm, to which it is pivoted, and the pawl carried by the drive-arm.

Figure 7 is a separate view of the regulator-frame seen at Figure 3, including the regulator-lever, and the releasing arm or bail, to which it is pivoted.

Figure 8 is a sectional plan of the devices 35 seen at Figure 3, but showing the line-space lever at the conclusion of its drive-stroke, and also illustrating the index and scale for use in adjusting the fulcrum of the regulator-lever.

Figure 9 is a sectional front elevation of the mechanism seen at Figures 3 and 5.

A carriage-returning and line-spacing handle 10 projects forwardly from a table 11, forming part of a bracket, which is secured upon the left-hand end plate 12 of the shiftable platen-frame 13 of an Underwood standard typewriting machine; a platen 14 being journaled in said platen-frame by means of an axle 15 having at each end a 50 hand-wheel 16. The main carriage is indicated at 16^a.

Said handle 10 is a lever of the second order, which turns about a vertical stationary rear fulcrum-pin 17. Said lever 10 is articulated at 18 to a lever 19 that carries at its outer end a pawl 20. At its end the pawl-lever 19 is pivoted concentrically with a vertical rotary main arbor 21. Fixed upon said main arbor is a wheel 22 of great diameter, having ratchet-teeth 23. As the lever 10 is used to drive the carriage 16^a from left to right at Figure 3, it swings about fulcrum 17 from left to right, carrying lever 19 in the same direction, together with the 65 pawl 20, which at this time is meshing with

the ratchet-teeth 23. Thus wheel 22 is revolved, together with a bevel pinion 24 (Figure 9) that is also fixed upon said vertical main arbor 21; said pinion meshing with a large bevel gear 25, which is fixed upon the platen-axle 15, thereby line-spacing the platen 14.

The pawl-lever 19 is a lever of the third order, and is employed for the purpose of multiplying the movement of the pawl 20, 75 as compared with the movement of the driving pivot 18. The parts are so arranged that this movement-multiplying lever 19 can swing, together with the ratchet-wheel 22, through an arc of about 120 degrees, at a maximum stroke of the line-space lever 10. The ratchet-wheel 22 having great diameter, as compared with the platen, and its teeth having very fine pitch, substantially accurate spacing of the platen is reliably secured. 85

The fulcrum-pin 17, in rear of main arbor 21, is made adjustable lengthwise of the line-space lever 10, to shorten the rear arm thereof. The lever is provided with a longitudinal slot 26, to accommodate such adjustment of the fulcrum-pin 17, and a maximum variation of 100 per cent or more, in the measurement of the line-space unit, may be secured by adjusting the fulcrum-pin 17 from its extreme rearward position to its 95 extreme forward position.

The stationary fulcrum-pin 17 may be set either at its extreme forward position, to give a minimum measurement of line-space unit, or at its extreme rear position to give a maximum measurement, or at any position intermediate said limits. 100

The direction of adjustment of the fulcrum-pin 17 is along the line-space lever slot 26 when the latter is seen at the extreme right-hand end of its working stroke, represented by a dotted line at Figure 2. (See also Figure 8.) The lever at this time is arrested by means of a stop 27, which is fixed in the path of the spacing pawl 20, 110 see Figure 3; the head of the pawl being beveled at 28, and the stop 27 being given a corresponding inclination, for the purpose of locking the pawl into the teeth of the ratchet-wheel, so that the latter cannot be 115 overthrown by reason of the momentum of the platen geared thereto.

The fulcrum-pin 17 is supported for adjustment by means of a slide 29, which underlies the top 30 of the table 11. An adjustment lever 30^a is provided with a finger-piece 31 for convenience in forcing the slide forwardly or backwardly. 120

The finger-lever 31 is pivotally mounted upon a fixed vertical shaft 57 within which the arbor 21 rotates. Lever 31 has a pin-and-slot connection 33 with the slide 29, and an index 33^a and scale 33^b aid the operator in determining where to adjust the fulcrum pin 17 by means of the slide. The lever 130

and slide are confined between the table 30 and a broad supporting washer 34, Figure 4, that is fixed upon shaft 57. The slide is also supported and guided by studs 35 pendent from table 30 and engaging longitudinal slots 36 in the slide. The slide has a wide slot 37 to clear the shaft.

The slide 29 and the guide-slots 36 are arranged diagonally, extending in the same direction as the slot 26 in the line-space lever when seen at the end of its driving stroke, as at Figure 8. It is possible for the fulcrum-pin 17 at this time to be adjusted forwardly or backwardly by means of the finger-piece 31, without vibrating the lever. No matter what the length of the driving stroke of the lever 10 may be, it will always be arrested, together with the spacing pawl, the ratchet-wheel and the platen, by means of the overthrow-stop 27, whose position remains fixed. A stop-pin 40 on the forward part of said lever 10 may normally rest against a regulator-lever 70, Figures 1 and 3.

To the lower end of the fulcrum-pin 17 may be swiveled a guide-block 42, grooved to fit over the edges of slot 26 in the line-space lever 10. At its forward end, the lever-slot 26 may have an arcuate enlargement 44, Figure 6, permitting the lever to clear the fixed shaft 57, and also facilitating the assembling of the lever, etc. The guide-block 42 and the lever 10 may be supported by a collar 45 that is secured upon the lower end of fulcrum-pin 17, Figure 5. The latter at its upper end is formed with a head-flange 43, riveted to the slide 29.

From the foregoing it will be seen that the platen may be line-spaced repeatedly by operating the carriage-returning lever 10, since the latter imparts to the line-space wheel 22 repeated rotations through a much greater angle than the vibration of the line-space lever; the movement of said line-space wheel being transmitted through vertical arbor 21, pinion 24, gear 25 and axle 15 to the platen; the drive stroke of the line-space lever being arrested by the overthrow-stop 27, and its return stroke being (if desired) arrested by the stop 41. The levers 10 and 19 are returned to normal positions by a spring 52, coiled around fixed shaft 57, or hub 56.

The pawl-lever 19 may be provided with the hub 56, which is pivoted upon said general shaft or bearing-post or stem 57, dropped from the table-top 30, and made hollow to serve as a bearing for the vertical arbor 21, line-space wheel 22 and pinion 24. The hub 56 of the pawl-lever 19 rests upon a shoulder 58 that may be formed upon the lower portion of said shaft, and the latter is drawn upwardly by a fastening nut 59, which is threaded upon the upper end of the shaft that extends up through a hole in the table-top 30. Upper and lower col-

lars 60 are confined between the table-top and a shoulder 61 (Figure 4) on the shaft, and these collars enable the nut 59 to force the shaft firmly up to a seat, for rigidity.

The pawl-lever 19 is confined loosely between the shoulder 58 and a washer 61^a fixed on the shaft. The pawl-arm 19 overlies the ratchet-wheel 22, and the pawl 20 is pivoted at 62 to the under side of said arm 19, Figure 5.

The normal position of the pawl-arm 19 is different for each adjustment of the fulcrum-pin 17. The shoulder 40 of said line-space lever may normally rest against said stop 41, but the pawl 20 is normally disconnected from the line-space wheel 22, to permit independent rotation of the platen by means of one of the hand-wheels 16 or by means of a thumb-wheel 63. The latter is fixed upon the projecting top of the line-space-wheel arbor 21. Fine adjustment of the work-sheet is afforded at any time by means of 63.

The multiple-tooth pawl 20 is brought accurately into mesh with the ratchet-wheel at the beginning of the drive stroke of lever 10, by means of a spring 64, under the control of a trip or cam 65, which normally restrains the pawl by engagement with a releasing shoulder 66 that is formed upon the pawl. This cam lies in the path of the shoulder 66, to be struck thereby at the conclusion of the return stroke of the line-spacing train, whereby the pawl is fended away from the ratchet-wheel 22, Figure 3. This release of the pawl, and its reengagement with the wheel, may be properly timed, throughout all of the variations in the measurement of the line-space unit which are secured by different adjustments of the fulcrum-pin 17. The adjustment of the line-space-lever-fulcrum pin 17 is also made effective to adjust the position of the pawl-releasing cam 65. This result is secured by providing a cam-train, which in many respects may be coincident with the line-space-lever train, see Figures 3, 6, 7 and 8.

The pawl-controlling train includes an arm or lever 68, which is fulcrumed upon the same general shaft or bearing post 57 as the pawl-arm 19, so that it may swing around said shaft to any desired position to intercept and release the pawl. Said arm 68 is articulated at 69 to said lever 70, and extends rearwardly and has a clearance 71 and a longitudinal slot 72, so that it mainly resembles in plan and displacement the line-space lever 10; the pivot 69 being coincident with 18, the lever bearing 73 being concentric with the shaft 57. The slot 72 of the lever is fitted to the same fulcrum-pin 17 that is used for the line-space lever 10.

The pin 17 is adjustable along the line-space lever with the cam-lever 70, and to the same extent. The effect is the same upon

both trains. If the parts are in the Figure 3 position during such adjustment, both the line-space lever and the cam-lever will be swung to the same extent; and the same will be true of the cam-lever 68 and the pawl-lever 19, as well as the pivots 18 and 69. Rearward adjustment of the pin 17 will effect an increase in the driving stroke of the pawl-lever 19, to increase the stroke of the ratchet-wheel; while the cam 65 swings to a corresponding position, so that thereafter the pawl may sooner be withdrawn automatically from the ratchet-wheel, with exactness of timing; and it is also reengaged to the ratchet with exact timing upon the starting of the succeeding line-spacing stroke.

Universal variation is obtainable in the extent of stroke of the pawl-arm 19, with concomitant resetting of the pawl-controlling cam 65. The operator needs only to adjust the pin 17.

At Figures 1 and 3 there is coincident with 18 a pivot 69, connecting regulator-lever 70 to a rocking bail, having arms 74 and 68, which have upper and lower bearings 73 upon the main shaft 57. Arms 74 and 68 may be formed as a bail in one piece with intervening vertical web-plate 76; the arm 74 overlying 68, see Figure 1. The lower bail-arm 68 may rest upon a flange 77 that is formed upon the bottom of bearing 57. Bail-arm 74 may be fitted upon a cylindrical portion of shoulder 61 that is formed on the collar 60. This bail-structure 74, 76, 68 may therefore be confined between 77 and 61^a for pivotal motion, to permit adjustment of the releaser 65. Exactness of timing in correspondence with any adjustment of 70, is effected by merely turning the handle 31.

The table 11, comprising a top plate 30 and a depending flange, and overlying the lever-system and the line-space wheel, may extend from the left from a bracket in the form of a plate 78 that is secured by screws 79 upon the left-hand carriage-end 12 of the Underwood standard machine; said end having the usual bearing for the platen-axle 15. An auxiliary vertical bracket 82 may be secured by screws 83 to the left-hand end of the platen-frame 13 in said machine, and may rise at the left of the gear 25 and have a bearing for the platen-axle 15, and may also be provided with a bent-out flange 84, to form a bearing for the lower end of the vertical arbor 21. The improvement may be manufactured and supplied as a unit for attachment to Underwood standard machines.

The trains may be made to do further duty in regulating the gross line-spacing stroke of lever 10, for either single, double or triple line-spacing; and preferably also for half-line spacing and also one and a

quarter, one and a half and two and a half line-spaces, for each lever-stroke. This adjustment involves setting the lever 70 edge-wise to corresponding stations or locations. Said lever has a locating tooth 88 adapted to seat in any one of a range of notches 89 cut in the bottom edge of the front flange 90 of the table.

It will be seen that wherever the above-described regulator-lever is set, it may serve to arrest the pin 40 of the line-space lever 10, and determine for how many line-space units the platen shall be rotated at each stroke, regardless of the measurement of the line space unit that is determined by the adjustment of the fulcrum-pin 17. When setting the regulator-lever 70, it will be seen that the multiple-tooth pawl 20 will be maintained out of engagement with the ratchet-wheel, because the releasing cam 65, in this form of the invention, is adjusted together with said lever 70, owing to the pivoting of the release arm to the lever 70.

If desired the line-space lever 10 may be held in its Figure 8 position during the re-settings of the regulator 70, although, if required, the two levers 10 and 70 may be swung together to either left or right during such adjustment, and in no case will the pawl 20 be engaged, or the platen rotated.

The tooth 88 may project upwardly from a slide 93 that may be guided in a slot 93^a by pins 94 projecting from the slide; and a spring 95 may hold the tooth 88 back in any notch. A finger-piece 96 may be carried by the slide.

In the diagram at Figure 2, 89 represents the line of space-regulating notches. Full-lines A represent the normal positions of the line-spacing levers when the machine is adjusted for three line-spaces of maximum unit measurement; this corresponding to Figure 3. Three-unit spacing may be obtained for any measurement of unit. Dot-and-dash lines B represent the normal position of the line-space levers when the fulcrum-pin 17 has been adjusted forwardly to provide a minimum measurement of the line-space unit, for three units.

The regulator-tooth 88 is shown in extreme left-hand position, for securing three spaces of either maximum or minimum unit-measurement. This tooth 88 may be shifted over to the right to a one-space position, at which time the lever 10 will normally occupy the position seen at C, if the fulcrum-pin 17 is at its rearward maximum-unit position. But if said pin 17 is placed at its forward extreme position, then the normal position of lever 10 is indicated at D. But from every starting position A, B and C, the lever swings to one final position E.

Certain features herein shown are disclosed in my senior application, No. 405,307, filed November 7, 1929, but the claims herein

are limited to organizations not disclosed in said application.

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. In a line-spacing mechanism, the combination of a line-spacing ratchet-wheel provided with a vertical arbor and having a multitude of teeth of minute pitch, a forwardly-extending line-space lever of the second order, a movement-multiplying arm connected in front of said arbor to said line-space lever and having a driving clutch for said line-space wheel, said line-space lever vibrating upon an axis which is parallel with the arbor of the line-space wheel, said clutch-arm being pivoted to turn about the axis of the line-space wheel, said line-space lever having a fulcrum in rear of said arbor, and means affording an adjustment of said fulcrum.

2. In a line-spacing mechanism, the combination of a line-spacing ratchet-wheel mounted upon a vertical arbor, a line-space lever of the second order and having a fulcrum which is stationary during the line-spacing operation, a movement-multiplying arm connected to said line-space lever forward of said arbor and having a driving clutch for said line-space wheel, said clutch-arm being directly pivoted to said line-space lever, the latter vibrating upon an axis which is parallel with and in rear of the arbor of the line-space wheel, said clutch-arm being pivoted to turn about said arbor, adjustable means in rear of said arbor for varying the leverage of the line-space lever upon the clutch-arm, and means affording an adjustment of said fulcrum.

3. In a line-spacing mechanism, the combination of a line-spacing ratchet-wheel mounted upon a vertical arbor, a line-space lever of the second order and having a fulcrum which is stationary during the line-spacing operation, a movement-multiplying arm connected to said line-space lever forward of said arbor and having a driving clutch for said line-space wheel, said clutch-arm being directly pivoted to said line-space lever, the latter vibrating upon an axis which is parallel with and in rear of the arbor of the line-space wheel, said clutch-arm being pivoted to turn about said arbor, adjustable means in rear of said arbor for varying the leverage of the line-space lever upon the clutch-arm, means affording an adjustment of said fulcrum, and separate independently settable means for determining the number of units of space through which said lever line-spaces the work-sheet at each operation.

4. The combination of a line-space wheel, a line-space lever, a clutch for said wheel,

means connecting said lever to said clutch, a fulcrum-pin for said lever which is stationary during the line-spacing operation, a slide upon which said fulcrum-pin is fixed, means for guiding said slide, a lever having a finger-piece for operating the slide, and an index and scale for said slide-lever.

5. The combination of a line-space wheel having a vertical arbor, a forwardly-extending line-space lever, a clutch for said wheel, a fulcrum-pin for said lever in rear of said arbor, a slide upon which said fulcrum-pin is fixed, means for guiding said slide, and a finger-piece for operating the slide, said fulcrum-pin projecting from said slide; and an arm to operate said clutch, said arm directly pivoted to said lever in front of said arbor and mounted to swing about the axis of said line-space wheel.

6. The combination of a line-space wheel provided with a vertical arbor and having a multitude of teeth of minute pitch, a forwardly-extending line-space lever of the second order, a pawl for said wheel, an arm for said pawl, means pivoting said lever to said arm forwardly of said arbor, a fulcrum for said lever in rear of the line-space wheel arbor, a slide upon which said fulcrum is fixed, means for guiding said slide, a finger-piece for adjusting the same, a regulator-lever fulcrumed upon said pin, a regulator-arm turning upon said arbor and pivoted to said regulator-lever forwardly of said arbor, separate means adjustable independently of said fulcrum for determining the number of units of space through which said lever line-spaces the work-sheet at each operation, and a stop for arresting said pawl and preventing overthrow, the direction of adjustment of said fulcrum-slide being such that at all adjustments thereof said line-space lever is arrested by said stop.

7. The combination of a line-space wheel having a vertical arbor, a line-spacing train including a line-space lever of the second order fulcrumed in rear of said arbor, a wheel-driving clutch, a driver mounted upon said arbor for said clutch, said driver pivotally connected to said lever in front of said arbor, a line-space-regulator train which is mainly a doubling of said line-spacing train and includes a regulator-lever coincidently fulcrumed with said line-space lever and having connected thereto a regulator-arm whose pivoting and lever-connection are coincident with those of said driver, said regulating arm having means for releasing said clutch from said wheel, a common fulcrum in rear of said arbor for said levers, a device for adjusting their fulcrum for varying their leverage, a line-space-regulating set of stations, means to detain said regulator-lever selectively at different stations, and a clutch-locking stop to arrest said line-space lever

at the same position for driving strokes of all lengths.

8. The combination with a line-space wheel having a vertical axis, of a forwardly-extending line-spacing drive-train, a line-space-regulator train including a regulator-lever having pivoted thereto in front of said axis a regulator-arm, the latter pivoted concentrically with said wheel and having means for controlling the connection of said drive-train with said wheel, and an adjustable fulcrum-device in rear of said axis for minutely varying the leverage of said regulator-lever.

9. The combination with a line-space wheel having a vertical axis, of a forwardly-extending line-spacing drive-train, a line-space-regulator train including a regulator-lever having pivoted thereto in front of said axis a regulator-arm, the latter pivoted concentrically with said wheel and having means for controlling the connection of said drive-train with said wheel, an adjustable fulcrum-device in rear of said axis for minutely varying the leverage of said regulator-lever, means to detain said regulator-lever selectively at different set stations, and a stop to arrest said driving train at the same position for driving strokes of all extents.

10. The combination of a line-space wheel provided with a vertical arbor and having a multitude of minute teeth, a line-spacing train including a forwardly-extending line-space lever and a wheel-driving pawl, a line-space-regulator train which includes a regulator-lever fulcrumed in rear of said arbor and having pivoted thereto in front of said arbor a regulator-arm, the latter having means for releasing said pawls from said wheel, a device for adjusting the fulcrum of said regulator-lever, a rack, and means to detain said regulator-lever selectively at different points in said rack.

11. The combination of a line-space wheel provided with a vertical arbor and having a multitude of minute teeth, a line-spacing train including a forwardly-extending line-space lever and a wheel-driving pawl, a line-space-regulator train which includes a regulator-lever fulcrumed in rear of said arbor and having pivoted thereto in front of said arbor a regulator-arm, the latter having means for releasing said pawl from said wheel, a device for adjusting the fulcrum of said regulating lever, a rack, means to detain said regulator-lever selectively at different points in said rack, and a single stop to arrest said line-space lever at the same position for driving strokes of all extents.

12. The combination with a line-space wheel, of a forwardly-extending line-space lever, a clutch for driving said line-space wheel, a stop to arrest the driving stroke of the line-space lever, a line-space-regulator train including a lever fulcrumed in rear of

the line-space wheel axis and means pivoted to said regulating lever to release said clutch from said wheel, a pivot connecting the regulating lever with said releasing means, a locating rack to co-operate with said regulator-lever to retain it selectively at predetermined locations, said regulator-lever having an adjustable fulcrum, said releasing means being mounted concentrically with said line-space wheel, an arbor for said line-space wheel, and a fixed shaft within which said arbor is journaled, said releasing means being pivoted upon said shaft.

13. In a line-space mechanism for a type-writing machine, the combination of a line-space wheel, a line-spacing train including both a forwardly-extending lever and a movement-multiplying arm driven thereby, the arm being mounted to rotate coaxially with said line-space wheel, a clutch operated by said arm, a line-space-regulating train including a lever fulcrumed in rear of the line-space wheel and also including a releasing device for said clutch, said releasing device pivoted coaxially with said wheel, and pivoted to said regulating lever, and means for varying the leverage of said regulating lever upon said releasing device, by adjusting the fulcrum of said regulating lever.

14. The combination of a line-space wheel, a line-spacing train which includes both a lever and a movement-multiplying arm which the lever directly drives, said arm mounted to rotate coaxially with said line-space wheel, a clutch for connecting said arm to said wheel, a line-space-regulating train including a forwardly-extending lever having an adjustable fulcrum at the rear of the wheel, said regulating train including a clutch-releasing arm pivoted to said regulating lever forwardly of the wheel-axis, a system of stations, and means for detaining said regulating arm at any station.

15. The combination with a line-spacing element and a line-space wheel, of a forwardly-extending line-space handle in the form of a lever of the second order, a support having mounted thereon for adjustment a fulcrum-pin at the rear of the line-space wheel for said lever, a movement-multiplying clutch-arm to which said lever is directly pivoted forward of the wheel-axis, said clutch-arm being in the form of a lever of the third order and being pivoted concentrically with said line-space wheel, and movement-reducing gearing connecting said line-space wheel to the line-spacing element.

16. The combination of a line-space regulating lever, means for setting it selectively at different fixed stations, a fulcrum-pin, said lever having a slot for said fulcrum-pin, a slide upon which said fulcrum-pin is mounted for adjustment along said slot, a guide upon which said slide is mounted for movement diagonally with reference to said

slot, and a pivoted arm having a pin-and-slot connection to said slide for adjusting the latter.

17. The combination of a line-space regulating lever, means for setting it selectively at different fixed stations, a fulcrum-pin, said lever having a slot for said fulcrum-pin, a slide upon which said fulcrum-pin is mounted for adjustment along said slot, a guide upon which said slide is mounted for movement diagonally with reference to said slot, a pivoted arm having a pin-and-slot connection to said slide for adjusting the latter, and a line-space wheel whose movements are to be regulated; said arm being pivoted concentrically with said line-space wheel, said line-space wheel having teeth of fine pitch, and a line-space driving pawl normally released from said wheel; said regulating lever having means for determining the point of release.

18. The combination of a line-space regulating lever, means for setting it selectively at different fixed stations, a fulcrum-pin, said lever having a slot for said fulcrum-pin, a slide upon which said fulcrum-pin is mounted for adjustment along said slot, a guide upon which said slide is mounted for movement diagonally with reference to said slot, a pivoted arm having a pin-and-slot connection to said slide for adjusting the latter, a line-space wheel whose movements are to be regulated; said arm being pivoted concentrically with said line-space wheel, said line-space wheel having teeth of fine pitch, and a line-space driving pawl normally released from said wheel; said regulating lever having means for determining the point of release, the pawl having a shoulder, and a cam controlled by said regulating lever to engage said shoulder to release the pawl.

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