March 10, 1936. J. Q. SHERMAN 2,033,868

TYPEWRITER ALIGNING AND SYNCHRONIZING MECHANISM

Filed June 28, 1928 2 Sheets-Sheet 1

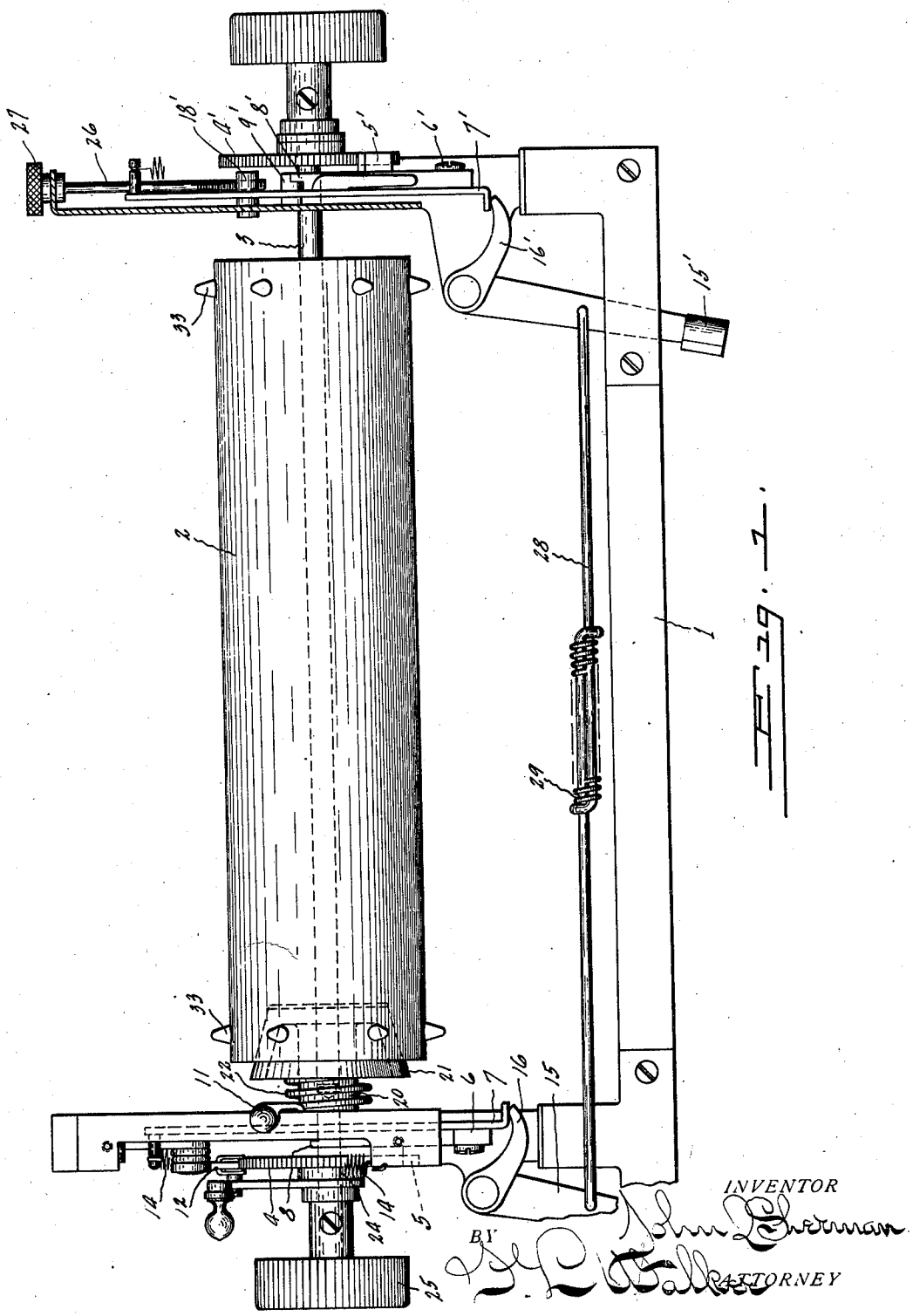


Fig. 1.

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TYPEWRITER ALIGNING AND SYNCHRONIZING MECHANISM

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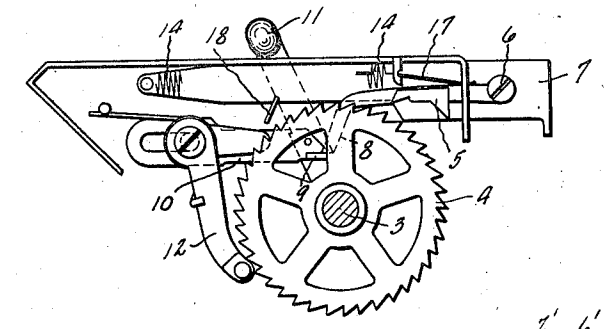


Fig. 2.

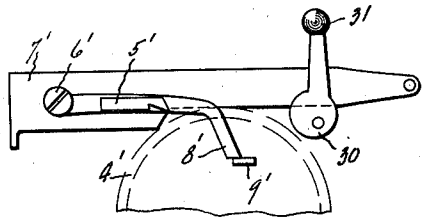


Fig. 4.

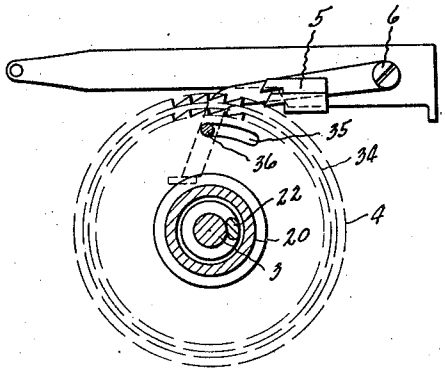


Fig. 5.

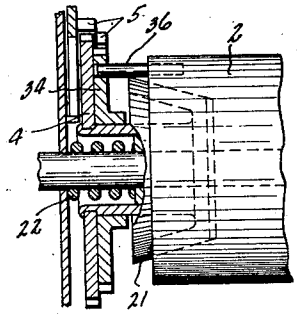


Fig. 6.

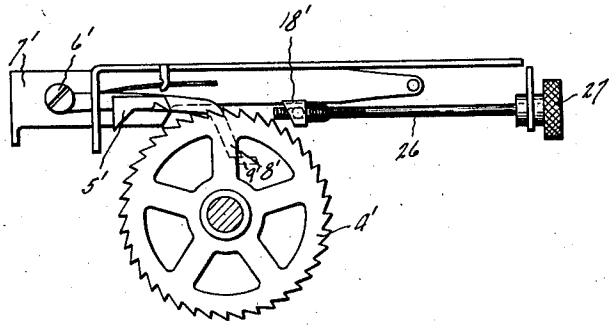


Fig. 3.

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UNITED STATES PATENT OFFICE

2,033,868

TYPEWRITER ALIGNING AND SYNCHRONIZING MECHANISM

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Application June 28, 1928, Serial No. 288,903

27 Claims. (Cl. 197—114)

This invention relates to typewriters, and more particularly, to universal means for synchronizing the line spacing and continuous strip paper feeding mechanism, employing webs of paper having thereon successions of printed forms.

While such machines are sometimes hand operated singly, they are frequently arranged in batteries or series, in which they are more or less distantly separated and are electrically controlled from a single master machine. Under such conditions it is quite necessary that the line spacing of different machines, and the advance from one printed form to another shall be absolutely synchronized. This necessitates accuracy of line spacing and paper feed and the registry of each succeeding printed form, whatever its length may be, with the line spacing means. Such accuracy is not incidental only to series operation of machines, but is quite as important for the operation of a single billing machine, or the like. In either case it is necessary that the spacing of the lines and the length of the forms upon the record strip be accurately dimensioned and that the feeding of the web be precisely controlled in order that the writing may be accurately registered upon lines of succeeding forms.

For economy of manufacture and operation it is quite desirable that so far as possible standard typewriter mechanisms be employed and commercial forms of manifolding paper strips be used. To insure accuracy of feeding operation these paper strips or webs are preferably marginally punched for use with a pin wheel feeding device.

The lengths of successive sections or forms upon a record strip do not always accord with the line spacing of a standard typewriter. Between the last line of one form and the initial line of the succeeding form it is frequently necessary to "justify" or "split lines" in order that the initial line on each succeeding form shall synchronize with the typewriter line spacing mechanism. This condition is further aggravated by the use of a pin wheel feed device and a perforated paper web necessary to insure accurate feeding and aligning operation for manifold forms. The standard typewriter line spacing occurs in thirds and sixths of an inch. The standard punched pin wheel paper for manifolding machines has, for example, its holes located at half inch intervals. The lengths of forms or writing sections upon the printed webs are not standardized. If all forms or writing sections upon such record strips were of a length equivalent to some common multiple of one-half and one-third, much of the difficulty of registration and necessity for synchronizing adjustment of the paper feed and line spacing mechanism at the completion of each writing would be avoided. It is found that to meet various conditions of use and commercial expediency, writing sections, bills or printed forms of various odd lengths are required. While some of these will harmonize with the differential of line spacings and feed holes, many will be found of intermediate lengths as 10¼ inches, 5½ inches, 3¾ inches, or other lengths involving fractional parts which may or may not agree with either the line spacing or the spacing of the paper perforations, but not with both. It is therefore necessary to adjust the accumulated discrepancy between the line spacing and the paper feed hole spacing and length of ticket or form at the end of each form or writing section in order that the line spacing means may be synchronized with the initial line of the next succeeding form, which as before stated, is always in a predetermined definite relation with the final margin of the preceding form.

Another difficulty is encountered in harmonizing the standard typewriter spacing, which as before stated, comprises three and six lines to the inch with printed forms set up in accordance with the standard point or pica type system wherein six lines will occupy .004 less than one inch and hence less than three or six lines of typewriter spacing. It is therefore necessary to provide means for compensating for such differential of standard typewriter spacing and the type line spacing upon printed forms.

While it would be quite possible to provide different typewriting machines for different sizes of bills and forms to be used, or it might be possible to equip typewriters with different interchangeable space mechanisms or interchangeable platens of different sizes and differently spaced pin wheel feed devices to meet the whims of customers for bills or forms of different lengths, such solution of the problem would be quite impractical from a manufacturing and commercial point of view.

The object of the invention is to overcome these difficulties by providing universal means by which the takeup or compensation for varying differential between the standard typewriter line spacing mechanism and line spacings of printed forms of different lengths may be effected in a single machine. For illustrative purposes, but without limiting the scope or application the present invention is illustrated and described as embodied in a standard commercial type of type-

writing machine having a rotating platen and the usual standard pawl and ratchet line spacing mechanism. In the present instance, however, the platen roll is interconnected with the line spacing mechanism by a slip connection or friction clutch, which, while ordinarily driving the platen roll in unison with the line spacing mechanism permits the roll to be independently adjusted relative to the line spacing means. To effect this independent adjustment of the roll relative to the line spacing means to an extent necessary to compensate for the differential between the line spacing mechanism and the paper feeding means there is provided at the opposite end of the roll an actuating means, which preferably though not necessarily, may be a second pawl and ratchet mechanism quite similar to the standard line spacing means. This second actuating means is connected directly to the roll and is adapted to adjust the roll relative to the line spacing means a distance determined by an adjustable stop which regulates the throw of the compensating means. This adjustable stop may be manually set to agree with each different length of writing section, bill or printed form to permit sufficient advance movement of the platen roll to bring the first line of the succeeding form into proper relation with the line feeding mechanism. The stop may, however, be automatically adjusted by the actuation of the line spacing mechanism to advance the stop a proportionate distance at each operation and thus effect a constant accumulation of lost motion through which the platen roll may be subsequently adjusted at any stage of operation to compensate for the differential existing between the line spacing and paper feed mechanism.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawings, wherein is shown the preferred, but obviously not necessarily, the only form of embodiment of the invention, Fig. 1 is a top plan view of the carriage of a well known type of typewriter, to which, for illustrative purposes, the present invention has been applied. Fig. 2 is an end elevation illustrating the feed acting compensating mechanism for the platen roll or paper feeding means, by which the platen roll may be advanced alternately of and relative to the line spacing mechanism. Fig. 3 is a detail view of the secondary spacing mechanism shown at the right in Fig. 1. Fig. 4 is a detail view of the modification of the stroke limiting means. Figs. 5 and 6 illustrate a cumulative compensating device for the spacing means.

Like parts are indicated by similar characters of reference throughout the several views.

While for illustrative purposes, the present invention has been illustrated as applied to a certain popular type of typewriter, it is to be understood that it is not limited to this particular style of typewriting machine, but may be applied to machines of other form and construction, or may be embodied in a distinctive typewriter mechanism designed solely for the present purpose.

Referring to the drawings, 1 indicates the carriage of a typewriting machine in which is mounted the platen roll 2 carried upon the shaft 3 journalled in the carriage frame. At the left side of the carriage 1 is the customary line spacing mechanism which includes a ratchet wheel 4 operatively engaged by an actuating pawl 5 pivoted at 6 to a reciprocating slide 7 mounted upon the carriage frame. The actuating pawl 5 is provided with a forwardly and downwardly extending supporting finger 8 which, when the pawl is retracted, rests upon a lip or flange 9 of a sliding bar 10, thereby holding the pawl 5 in an elevated inoperative position. As the slide 7 advances the finger 8 rides over the lip or flange 9 and, as it passes therebeyond, it falls allowing the actuating pawl 5 to engage with the ratchet wheel 4. This engagement is effected earlier or later in the stroke of the actuating pawl and slide 7 to effect an advance of the ratchet wheel of one step, two steps or three steps, by the to and fro adjustment of the slide bar 10 by means of the oscillating lever handle 11. Thus, by the adjustment of the lever handle 11, the mechanism is set for single, double or triple space. A spring actuated arm 12 engages the teeth of the ratchet wheel to prevent return movement and to center the teeth in their advanced positions. This arm operates somewhat as a click pawl. The actuating slide 7 is retracted by a spring 14 against the yielding resistance of which it is reciprocated by the oscillation of a manually operated spacer lever 15 having a finger 16 engaging the extremity of the actuating slide 7. At the limit of the actuating stroke and after the supporting finger 8 has passed beyond the limit of the lip or flange 9 and falls under the influence of the spring 17, permitting engagement of the actuating pawl 5 with the ratchet wheel 4, the arm 8 engages a stop lug 18 fixed upon the carriage frame which limits the actuating stroke. As thus far described, the mechanism is that of a typical and well known typewriter construction and forms no part of the present invention per se. In such customary typewriter construction the ratchet wheel 4 which determines the line spacing of the machine is fixedly secured upon the platen roll shaft 3.

However, the present construction differs from such customary typewriter construction, by mounting the ratchet wheel 4 loosely upon the shaft and operatively connecting it with the platen roll 2 by means of a friction clutch. Such construction provides for unison rotation of the ratchet wheel 4 and the platen roll 2 under normal paper feeding conditions, but permits a differential adjustment of the platen roll 2 relative to the ratchet wheel for compensating for the irregularity of the paper feed and odd lengths of writing sections or bills, and to synchronize the writing lines with the line spacing mechanism. In the particular form of embodiment illustrated, the ratchet wheel 4 is secured to one end of a hub 20 upon the opposite end of which is formed a conical head 21 forming the male element of a friction clutch. This conical clutch head 21 engages in a corresponding socket or recess in the end of the platen roll 2. The conical clutch head 21 is held normally in driving engagement with its seat in the end of the platen roll 2 by a spring 22 surrounding the shaft 3 within the hub of the interconnected ratchet wheel and clutch head. This spring 22 bears at one end upon a shoulder formed in the bore of the hub and at its opposite end upon the hub 24 of the usual knob 25 by which the platen roll may be manually rotated. Thus the line spacing mechanism at the left of the typewriter carriage in the present

embodiment is substantially as found in the commercial typewriters of this type with the single exception that the line spacing ratchet wheel is operatively connected with the platen roll in such a way as to permit a relative adjustment of such members.

For differentially adjusting the platen at the completion of each written form to compensate for the increased space between succeeding forms, which space may not coincide with any multiple of the line spaces, an auxiliary platen actuating mechanism is provided at the opposite end of the platen. It is not enough to merely advance the platen a prescribed distance between written forms, but it is necessary that the writing position in which the platen is left by such form spacing step shall be in accord with the normal line spacing mechanism. That is if the normal line spacing mechanism is in a half step position at the completion of the form space adjustment, the next operation of the line spacing mechanism would advance the platen only a half step and the form lines would thus be displaced out of writing position. It is therefore necessary to synchronize the line spacing mechanism with the form spacing platen movement, which is effected by interconnecting the line spacing and form spacing mechanisms whereby the normal line spacing mechanism is actuated to the limit of its movement and held in such position while the platen is further advanced to its limit of movement necessary to bring the first line of the succeeding form into writing position, so that at the completion of the operation the line spacing mechanism will be properly synchronized with the writing lines of the advanced form.

The right hand end of the carriage, as illustrated in the drawing, carries a second actuating mechanism of the same general type. This mechanism includes a ratchet wheel 4', in this instance fixedly connected upon the platen roll shaft 3 and hence invariable with its relation with the roll. Like the normal line spacing mechanism this ratchet wheel 4' is adapted to be advanced by an actuating pawl 5' pivoted at 6' upon the reciprocating slide 7'. The actuating pawl is provided with a supporting finger 8', which when the pawl is retracted, rests upon the supporting lip 9' projecting from a bar similar to the bar 10 of Fig. 2. In this construction the support 9' for the actuating pawl may be fixedly mounted and the adjusting lever 11 may be omitted. Other means is provided for regulating the throw of the actuating pawl 5' and the advance of the ratchet wheel 4'. To this end the stop lug 18' corresponding to the lug 18 of the primary construction is preferably slidingly adjustable upon the carriage frame structure and is advanced or retracted by a screw stem 26 having a head or knob 27 by which it may be rotated to vary the position of the stop lug 18'. Thus, by retracting this stop lug the actuating pawl 5' may be permitted a greater degree of movement before the finger 8' engages the stop. The stop lug 18' for the secondary mechanism is adjusted by a screw stem 26 to a position different from and somewhat beyond the normal position of the lug 18 of the primary line spacer mechanism. This permits the form spacing mechanism a limited degree of overthrow, the extent of which is regulated by the adjustment of the stop lug 18' by means of its stem 26. The form spacing mechanism at the right of the carriage is operated by a spacing lever 15' having a finger 16' engaging the extremity of the actuating slide 7' as before described. To facilitate the operation and insure unison movement, these operating levers 16 and 16' are interconnected by a jointed link rod 28, the sections of which are slidingly adjustable upon each other. Interposed between the sections of the link rod 28 is a helical spring 29, the resistance or tension of which is somewhat greater than the operating resistance of the primary line spacing mechanism at the left of the carriage.

During normal operation the line spacing lever at the left is operated to advance the platen roll equal distances as determined by such line spacing mechanisms. When the end of the writing section, bill or printed form is reached the operating lever at the right of the carriage, as shown in the drawings, is operated to effect a compensating relative adjustment of the roll and line spacing means. During the normal operation, the actuation of the operating lever 15 pertaining to the line spacing mechanism acts independently of the operating lever 15' for the form spacing mechanism. During this operation the sections of the connecting link rod ride idly upon each other. The sliding movement of the jointed link rod enables the line spacing operation to be effected entirely independent of the form spacing mechanism. In the application of the invention to the type of typewriter illustrated it is necessary that the line spacing means be locked while effecting the form spacing relative adjustment of the platen roll. For this reason the line spacing means is operatively connected with the form spacing means, whereby the two mechanisms will operate in unison until the line spacing mechanism reaches the limit of its stroke, in which position the pawl finger 8 is wedged beneath the inclined stop lug 18. At this time, however, the form spacing mechanism is capable of a still further movement since the actuating pawl will not yet have reached the limit of its stroke. The operation of the lever 15' pertaining to the form spacing mechanism acts through the jointed link rod 28 to effect the locking movement of the line spacing mechanism. The interposed coupling spring 29 in the link rod is of sufficient tension that it will transmit the pulling effect of the operating lever 15' to the primary lever 15 without yielding. However, as the line spacing mechanism comes to rest in the locked position with its pawl finger 8 wedged beneath the inclined stop lug 18, the form spacing mechanism at the opposite side of the carriage will continue its movement against the yielding resistance of the interposed coupling rod spring 29. The ratchet wheel of the form spacing mechanism being positively connected with the platen roll, the latter will be rotated through such additional stroke of the form spacing mechanism while the line spacing mechanism remains locked. This differential adjustment is effected by slipping the clutch connection of the conical heads 21 with the end of the platen roll. The degree of differential adjustment or overthrow of the platen roll is determined by the position of the adjustable stop lug 18' which may be variously positioned by the screw stem 26 in accordance with the length of the bill or printed form.

Instead of slidingly adjusting the stop lug 18' by means of the screw stem 26 an eccentric stop 30 may be provided operable by the lever 31 to vary the stroke of the form spacing mechanism.

While the apparatus is applicable to a typewriting machine having a plain platen roll, feed-

ing the paper by frictional contact, to insure positive feed of the paper web and to effect registry of superposed manifold strips, the roll 2 is preferably provided with a series of pin wheel projections or teeth 33 adjacent to each end. These pin wheel teeth or spurs 33 operatively engage in uniformly spaced marginal punchings in the record strips or paper web.

While the paper web or strips are ordinarily punched with feed holes at half inch intervals it is not necessary that the platen roll shall be provided with spurs or pin wheel teeth to engage every successive feed hole. It is sufficient if the spurs or teeth 33 are located to engage alternate feed holes or even those more distantly spaced, providing there is a pin wheel spur at each end of the roll always in engagement with the marginally punched paper.

In the construction heretofore described, the stop lug 18' or eccentric stop 30 is manually adjusted to the position to agree with the excess length of such bill or form beyond a multiple of the line spacing distance, and each operation of the form spacing mechanism effects the same degree of overthrow. It is possible to provide for a constant accumulation of excess at each operation of the line spacing mechanism.

In Figs. 5 and 6 there is shown such construction wherein a second ratchet wheel 34 of somewhat less diameter than the ratchet wheel 4 is positioned for rotation in a parallel plane. The ratchet wheel 34 is free upon its journal mounting. In this construction two actuating pawls 5 are mounted upon the same pivotal center 6, one of which engages the line spacing ratchet wheel 4, and the other of which engages the loosely mounted ratchet wheel 34. These actuating pawls operate in unison through uniform stroke. However, the difference in diameter of the ratchet wheels causes the wheels to be rotated differentially, whereby the smaller wheel will gain slightly upon the larger wheel at each operation. The degree of such gain is determined by the relative diameters of the ratchet wheels, which in the drawings have been greatly exaggerated. In the stop disc 34 there is provided a concentric slot 35 into which projects a stop pin 36 carried by the platen roll 2. The platen roll 2 is differentially advanced by the compensating mechanism until the stop pin 36 engages the forward end of the arcuate slot 35 in the ratchet wheel 34 to limit its compensating movement. As the ratchet wheels 4 and 34 are actuated in unison the stop wheel 34 is gaining slightly upon the line spacing ratchet wheel 4 and will advance the slot 35 relative to the stop pin 36. This advance occurs progressively at each operation. Thus at the beginning of the writing operation the pin 36 is at the forward end of the slot 35 as shown in Fig. 5. However as the stop disk 34 advances slightly faster than the platen roll, due to the difference in size of the ratchet wheels 34 and 4, a clearance space will gradually accumulate at the forward end of the slot 35 in advance of the pin 36 until at the completion of the writing operation the pin 36 will occupy a position more or less close to the rear end of the slot. The clearance space thus accumulated in advance of the pin 36 by the differential movement of the slotted ratchet wheel 34 permits a subsequent advance movement of the platen roll independently of the disk 34 until the pin 36 again contacts the forward end of the slot 35 to limit such adjusting movement of the platen roll. Upon operation of the form spacing mechanism by oscillation of the operating lever 15' the platen roll 2 will be advanced until arrested by engagement of the stop pin 36 in the end of the slot 35. The degree of such compensating movement of the platen roll will be dependent upon the distance that the roll has been advanced normally under influence of the line spacing mechanism. In other words, the compensating movement permitted by the advance of the slot 35 is always proportionate to the preceding advance of the roll under successive normal operation of the line spacing mechanism.

The construction illustrated in Figs. 5 and 6 is shown as a substitute for the construction illustrated at the left of Fig. 1. The construction at the right of Fig. 1 in such case would be similar to that illustrated except that there would be no necessity for the adjustable stop 18' and its actuating screw 26 since the end of the slot 35 in the ratchet wheel 34 performs the function of the stop 18' in limiting the excess movement of the roll under influence of the operating lever.

Having thus described my invention, I claim:

1. In a typewriter, or the like, a platen roll, two pawl and ratchet actuating mechanisms therefor, one located at each end of the roll, a friction clutch connecting the roll with one of the actuating mechanisms, the other actuating mechanism being positively connected with the roll, stop means for each actuating mechanism limiting the advance movement of the roll under the respective mechanisms to different degree, one of said mechanisms operating to determine the spacing between succeeding lines of a writing, and the other determining the spacing between succeeding writings and coupling means for said actuating mechanisms for effecting unison operation thereof until one mechanism is arrested by its corresponding stop means, the roll being actuated through additional movement by the other mechanism.

2. In a typewriter, or the like, a platen roll, separate actuating mechanisms for the roll, a clutch connection between the roll and one of the actuating mechanisms, the other mechanism being positively connected with the roll, both mechanisms being adapted to advance the roll in unison therewith, but to different degree, said clutch permitting the roll to advance independent of one mechanism when under the actuating influence of the other and inter-connecting means between the respective roll-actuating mechanisms by which said mechanisms are caused to operate in unison, each mechanism being further capable of operation to advance the roll independent of the operation of the other mechanism, substantially as and for the purpose specified.

3. In a typewriter, or the like, a platen roll, separate actuating means therefor, each adapted to advance the roll a disproportionate distance, stop means for limiting the advance of the roll under influence of each actuating means to predetermined degree and means for justifying the limit of movement of the platen under the influence of one actuating means with the limit of movement thereof under the other actuating means.

4. In a typewriting machine, or the like, a platen roll, means for intermittently advancing the roll proportionate distances, and additional means for advancing the roll a further predetermined disproportionate distance and means for automatically readjusting the respective roll advancing means into coincidence with each other at the completion of each movement by said second means.

5. In a typewriting machine, or the like, a pin

wheel feed device for marginally punched paper, and a pawl and ratchet line spacing device controlling the extent of normal feeding movement of the pin wheel feed device, said devices being normally interconnected for unison operation, and single operating means for operating said line-spacing device to the limit of its normal range of actuating movement and thereafter furthere adjusting one of said devices independent of the other through a measured distance to relatively adjust the line spacing means and the feed holes of the paper after completion of each written section.

6. In a typewriter, or the like, a pin wheel paper feed device, separate actuating mechanisms therefor, each adapted to advance the pin wheel feed device different distances, an adjustable stop means for one of the actuating mechanisms limiting the advance of the pin wheel under the influence thereof to distances disproportionate to the movement of the pinwheel under the influence of the other actuating mechanism interconnecting means by which the separate actuating mechanisms are operated in unison, each actuating mechanism being capable of advancing the paper feed device independent of the other mechanism.

7. A typewriter, or the like, employing marginally punched paper whereon the initial writing lines of succeeding sections are located in predetermined relation with the final margins of the preceding sections and whereon the final margin of the writing sections are in disagreement with the line spacings, a pin wheel feed device for the paper, a line spacing mechanism for advancing the pin wheel device in accordance with the line spacings, and an actuating mechanism for simultaneously advanacing the line-spacing mechanisms and pin wheel feed device at the end of each writing section of the paper through the normal range of movement of the line-spacing mechanism and while holding the line-spacing mechanism at the limit of its range of movement giving to the pinwheel feed device an additional movement relative to the line spacing mechanism until the initial writing line of the succeeding section is in synchronism with the line spacing mechanism.

8. A typewriter, or the like, employing marginally punched paper whereon the initial writing lines of succeeding sections are located in predetermined relation with the final margins of the preceding sections and whereon the final margin of the writing sections are in disagreement with the line spacings, a pin wheel feed device for the paper, a line spacing mechanism for advancing the pin wheel device in accordance with the line spacings, and an actuating mechanism for advancing the pin wheel feed device at the end of each writing section of the paper relative to the line spacing mechanism and adjustable stop means for limiting the advance of the pin wheel feed device in accordance with the extent of succeeding writing sections to synchronize the initial writing line of each section with the line spacing mechanism.

9. A typewriter, or the like, employing paper divided into sections and subdivided into lines spaced disproportionately to the length of the sections, a paper aligning and feed device, line spacing mechanism for intermittently advancing the feed device distances proportionate to the line spacing upon the paper, stop means limiting the range of advance movement of the line-spacing mechanism and additional actuating means for advancing the feed device disproportionately to the line spacing at the end of each written section, and stop means for limiting such disproportionate advance in accordance with the length of the written section coupling means interconnecting said line spacing and additional actuating means for unison operation throughout a range of movement determined by the line spacing mechanism, and a yielding connection between the paper feeding device and line spacing mechanism permitting further independent movement of the paper feeding device under influence of said additional actuating means to align the initial writing line of the succeeding paper section with the line spacing mechanism.

10. The combination with a typewriter, including a platen roll and line spacing means, actuating means for adjusting the roll relative to the line spacing means and adjustable stop means for automatically limiting the degree of relative adjustment to synchronize the writing position upon the platen with the line spacing means.

11. The combination with a typewriter, including a platen roll and line spacing means therefor, of actuating means for adjusting the roll relative to the line spacing means, stop means for limiting the degree of independent adjustment of the roll, and means for automatically adjusting said stop by the operation of the line spacing means.

12. The combination with a typewriter, including a platen roll and line spacing means therefor, of actuating means for adjusting the roll relative to the line spacing means, a stop member, means for actuating the stop member in unison with the line spacing means, but to different degree, interengaging contact portions upon the roll and stop member and means for advancing the roll relative to the line spacing means until arrested by the engagement of said contact portions.

13. The combination with a typewriter, including a platen roll, a pawl and ratchet mechanism for intermittently advancing the platen roll, a second pawl and ratchet mechanism operating in unison with the roll but to different degree, interengaging stop portions upon the second ratchet member and roll, means for advancing the roll relative to the first pawl and ratchet mechanism until arrested by the interengagement of the stop portions of the roll and second ratchet.

14. The combination with a typewriter, including a platen roll and line spacing means comprising a pawl and ratchet wheel for intermittently advancing the roll uniform distances, a slip connection between the ratchet wheel and roll, a second ratchet wheel concentric with the first wheel free for independent rotation, means for rotating said ratchet wheels in unison but to different degree, said second ratchet wheel being movable independently of the first ratchet and the roll, a stop shoulder upon said second ratchet wheel and a complementary stop portion carried with the roll and means for advancing the roll relative to the first mentioned ratchet wheel until arrested by the interengagement of said stop portions.

15. In an apparatus of the character described, paper feeding and aligning means, line spacing mechanism determining the extent of the normal paper feeding operation, means for normally actuating the said means and mechanism in unison, and means including a ratchet for effecting differential adjustment of the paper feeding means beyond the range of unison adjustment of such paper feeding means and the line spacing mechanism.

16. In an apparatus of the character described,

pin wheel feeding means for superposed paper strips, line spacing mechanism for intermittently advancing the pin wheel feeding means uniform distances, and compensating mechanism for effecting an overthrow movement of the pin wheel feeding means through a predetermined degree an actuating means for effecting operation of the line spacing mechanism through the full range of its movement and for holding said mechanism at the limit of its movement whereas the compensating mechanism advances the pin wheel feeding means through said additional movement.

17. A typewriter, or the like, including a platen roll, line spacing mechanism for advancing the platen roll uniform distances, compensating mechanism for advancing the platen roll relative to the line spacing mechanism at the end of each writing, and adjustable stop means for limiting the advance of the platen roll to a movement different from that effected by the line spacing mechanism to synchronize the writing position upon the platen roll with the line spacing mechanism.

18. The combination with a typewriter, including a pin wheel paper feeding means and line spacing means, normally operatively interconnected for unison operation, compensating means for relatively adjusting the pin wheel paper feed means and the line spacing means in relation one to the other and adjustable stop means for limiting the degree of such relative adjustment.

19. The combination with a typewriter, including a pin wheel paper feeding means and line spacing means, normally operatively interconnected for unison operation, compensating means for relatively adjusting the pin wheel paper feed means and the line spacing means in relation one to the other and stop means for limiting the degree of such relative adjustment, and means for automatically varying the stop means in accordance with the extent of unison adjustment of the pin wheel paper feed means and line spacing means.

20. In a typewriting machine, the combination with a platen of a step by step line spacing mechanism mounted at one end of the platen and a supplemental platen actuating means at the opposite end of the platen for advancing the platen a distance greater than the normal step by step movement of the line spacing mechanism, said line spacing means being operable independently of the supplemental actuating means and an interconnection by which the line spacing means is actuated through the movement of one full step in unison with the supplemental means and held in such advanced position during the further advance movement of the platen under influence of the supplemental actuating means, whereby the final position to which the platen is advanced by said supplemental actuating means will agree with the final position of advance of the line spacing mechanism.

21. In a writing machine, means for feeding and aligning the record material with the writing position, a pawl and line spacing device determining the degree of operative movement of the paper feeding and aligning device, means for operating the line spacing and paper feeding and aligning means in unison during the operating period, and means for differentially adjusting the line spacing and the paper feeding and aligning means so as to register and align the starting point of the paper with the writing position of the machine and means for predetermining the extent of such differential adjustment.

22. In an apparatus of the character described for use with continuous lengths of record material having forms thereon of uniform length, the combination with a writing machine including a line spacing mechanism of a feeding mechanism additional to the line spacing mechanism, for advancing the record material, a distance unequal to any multiple of the line space movement terminating the advance movement of the record material in position for full stroke actuation by the line spacing mechanism whereby no lost motion of the line spacer mechanism will occur, said feeding mechanism being adapted to limit the advance movement of the record material when the first line of the succeeding form is in writing position, when no further advance movement of the record material may be made by said feeding mechanism without a return movement thereof.

23. The combination with a writing machine of a pin type feeding device engageable in marginally punched holes in superposed strips of series connected forms, line spacing means for actuating the pin type feeding device to advance the strips of forms through a step by step motion while maintaining registry of superposed forms, actuating means for advancing the pin type feeding device relative to the line spacing means, and a stop for automatically limiting the combined movements of the pin type feeding device to a predetermined measured distance sufficient to present the initial writing areas upon a succeeding set of superposed forms in registry with each other at the writing position in synchronism with the line spacing means.

24. The combination with a writing machine of a pin wheel feeding device engageable in marginal holes in superposed strips of registering series connected forms for advancing the forms in registry past a writing position, line spacing means therefor, actuating means for adjusting the pin wheel feeding device relative to the line spacing means and stop means for limiting the degree of adjustment of the pin wheel feeding device under the combined influence of the line spacing means and said actuating means to a measured distance sufficient to present the succeeding superposed forms in registry with each other at the writing position in justified relation with the line spacing means.

25. In a writing machine, a traveling pin type feeding device engageable in marginal holes in superposed strips of series connected form of equal length for advancing the strips past a writing position while maintaining corresponding forms in registry, line spacing mechanism for actuating the pin type feeding device through a step by step motion to advance superposed forms in registry successive equal distances, a clutch mechanism intermediate the line spacing mechanism and the pin feeding device, a form ejecting means for actuating the pin type feeding device to advance the strips the remainder of one form length, while maintaining registry of superposed portions thereof, and stop means limiting the combined advance movements of the strips to a single form length and arresting the superposed strips with the initial writing spaces of succeeding superposed forms in registry with each other coincident with the writing position, said clutch mechanism permitting movement of the pin type feeding device relative to the line spacing mechanism under the influence of the form ejecting means, whereby the line spacing

mechanism may initiate a new cycle of operation without lost motion.

26. In a writing machine wherein superposed strips of series connected forms of equal length are advanced past a writing position, a pin type feeding device engageable in spaced holes in the superposed forms for positively advancing the forms past writing position while maintaining superposed portions thereof in registry, a line spacing mechanism with which the pin type feeding device is interconnected for differential adjustment, adapted to intermittently advance the pin type feeding device through a step by step motion to advance the strips successive uniform distances, actuating means for differentially advancing the pin type feeding device relative to the line spacing means through the remainder of one form length, and stop means for arresting the combined advance movements of the pin type feeding device with the initial writing spaces of superposed forms in registry with each other coincident with the writing position and in justified relation with the line spacing mechanism, whereby the line spacing mechanism may initiate a new cycle of feeding operation without lost motion.

27. The combination with a writing machine, wherein imprinting devices cooperate with a platen to imprint in predetermined writing spaces of superposed strips of series connected forms of uniform length which are intermittently advanced past an imprinting position, characterized by pin type feeding means engageable in relatively spaced holes in the superposed forms to present corresponding writing spaces for the superposed forms in registry at the imprinting position, actuating means for intermittently operating the pin type feeding means to advance the strips through successive movements, and space determining means confining the movements of the pin type feeding means to a predetermined cycle of line spacing movements necessary to present writing spaces of superposed forms subsequent to the initial writing space thereof in registry at the imprinting position, and a final form spacing movement necessary to present the initial writing spaces of the succeeding superposed forms in registry at the writing position preparatory to repetition of the cycle of advance movements, and means for justifying the termination of the final form spacing movement with the initiation of the succeeding line spacing movement whereby the succeeding cycle of operation may be initiated without lost motion.

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