Sept. 12, 1933. J. K. MARSHALL ET AL 1,926,294

VARIABLE SPACING MECHANISM

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Fig. 1.

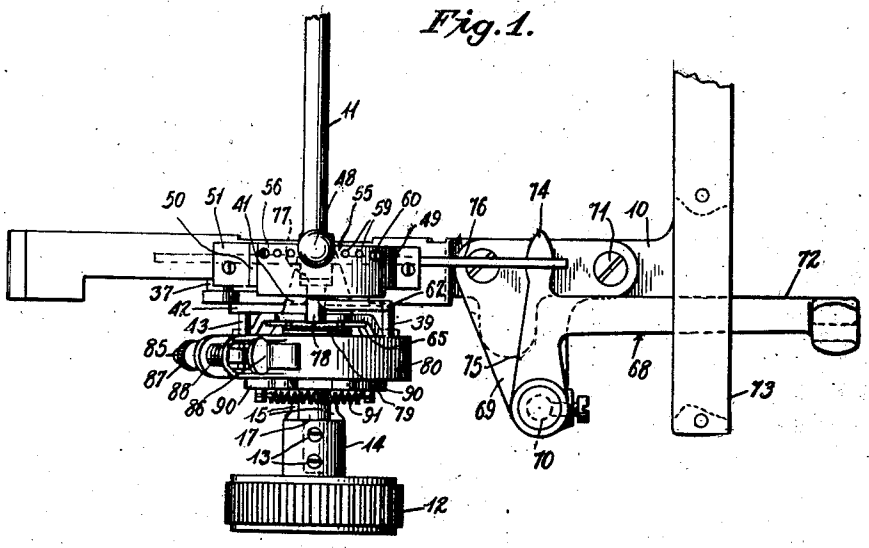

Fig. 2.

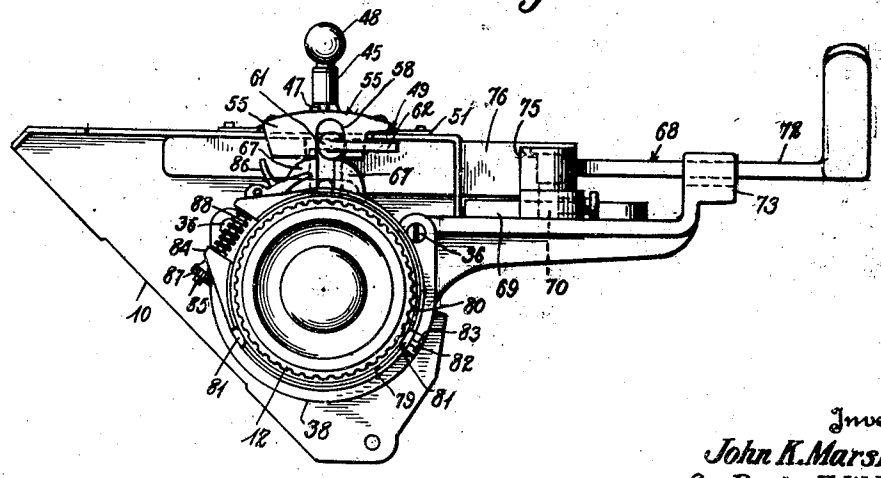

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Fig. 3.

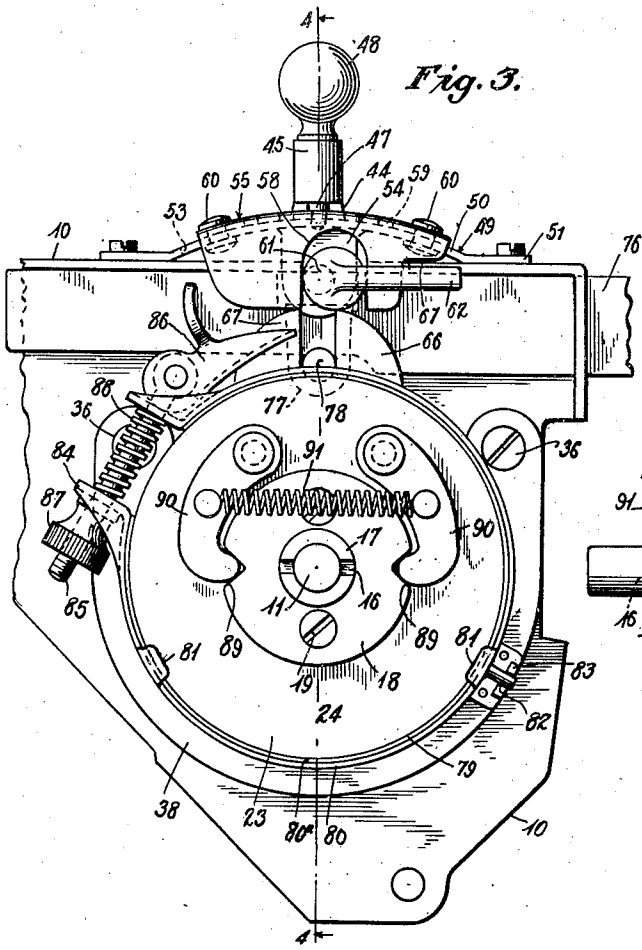


Fig. 4.

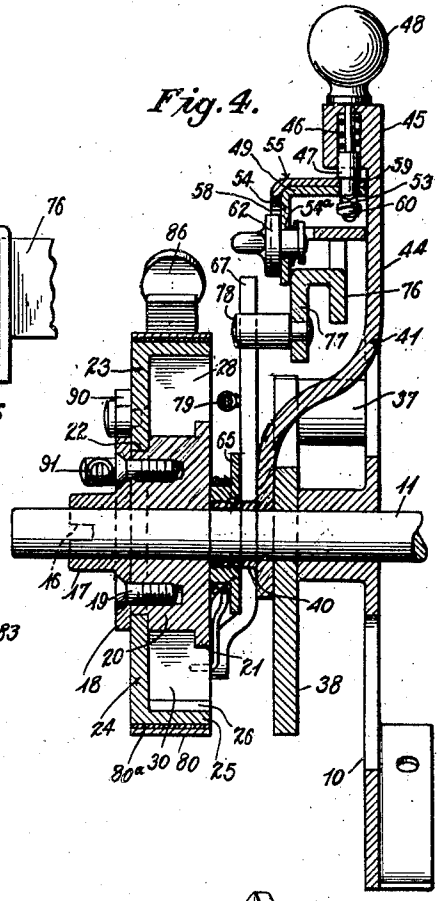


Fig. 11.

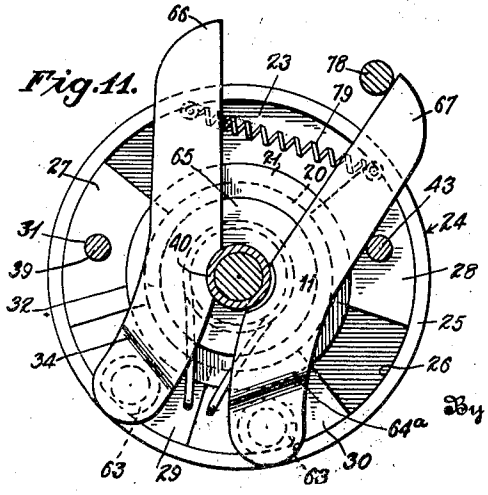
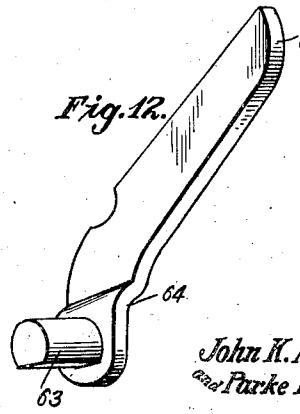


Fig. 12.



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VARIABLE SPACING MECHANISM

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Fig. 5.

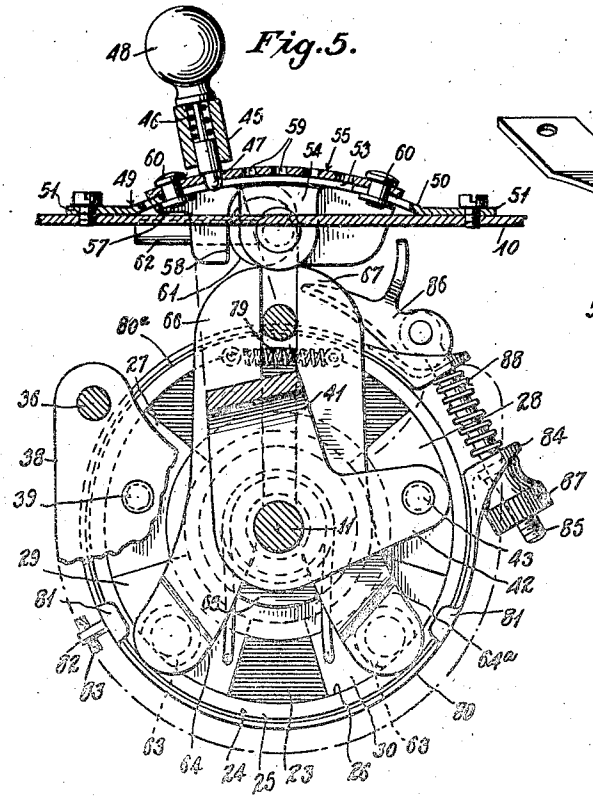


Fig. 7.

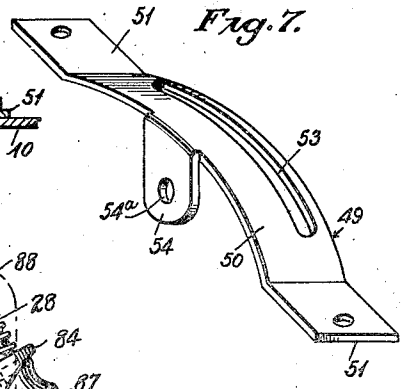


Fig. 8.

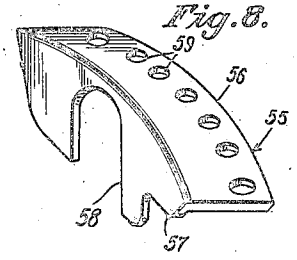


Fig. 6.

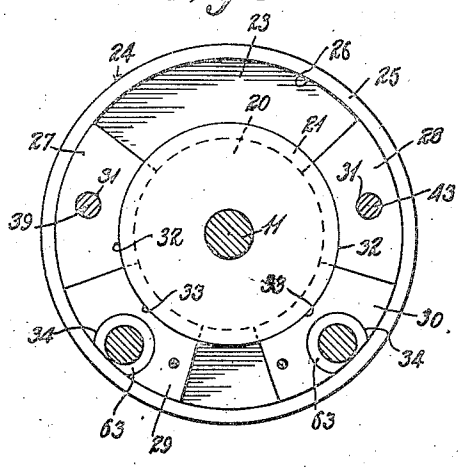


Fig. 9.

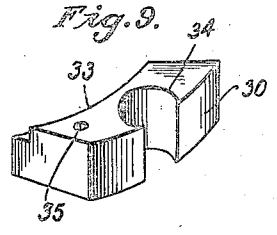
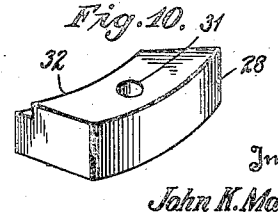


Fig. 10.



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UNITED STATES PATENT OFFICE

1,926,294

VARIABLE SPACING MECHANISM

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Application August 9, 1929. Serial No. 384,638

22 Claims. (Cl. 197—114)

This invention relates to improvements in spacing mechanism and is especially adapted for use in connection with writing machines, such as typewriters, adding machines, bookkeeping machines and the like, although its use necessarily is not so limited for it will be found applicable to any type of machine where a periodic or step by step motion is desired and particularly where such motion is rotary.

The primary object of the invention is to provide mechanism which is capable of use for producing a periodic or step by step movement of a member to be actuated or driven thereby.

A further object of the invention is to provide mechanism of the above mentioned type which will produce such movement either in a single direction or in opposite directions, said mechanism further being capable of adjustment to vary the extent or amount of such movements.

When applied to a typewriter, the mechanism is capable of use for rotating the platen carrying shaft uniformly in either direction to move the paper being typed upon whereby the written lines will be uniformly spaced and any previously written lines may be accurately returned to the writing position or positioned in alignment with the writing gauge of the machine. In the makes of typewriters now in common use, the spacing mechanism for the platen shaft is capable of adjustment for causing the written lines to be separated any one of a predetermined number (usually three) of single standard spaces. When an operator is required to type on lined or ruled paper, it usually is desirable to follow the same spacing as that of the lines on the paper so that each line of typing will be placed upon or coincide with a ruled line. The manufacturers of paper stock have no set standard for spacing lines on any of the many different kinds of paper now being made and for this reason a wide variance in spacings is encountered. It therefore is another object of this invention to provide spacing mechanism by means of which a platen or paper feeding shaft may be moved to cause the written lines to be separated any one of the usual number of single standard spaces or any one of a predetermined number of intermediate spaces and which may be adjusted for varying the total or maximum range of movement whereby the space or distance between typed lines may be changed as desired. The extent of change in the spacing of the written lines may be infinitely small and is limited only by the vision of the operator. This adjustment of the spacing mechanism, therefore, will permit an operator to follow the lines on the paper being used irrespective of the width of the spaces between the ruled lines.

Still another object of the invention is to provide as a part of such mechanism means for moving the actuated or driven member without regard for spacing and yet to permit the said member accurately to be returned to the position it occupied prior to such movement.

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

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a top plan view of the spacing mechanism embodying this invention,

Fig. 2 is a side elevational view of the mechanism disclosed in Fig. 1,

Fig. 3 is an enlarged side elevational view with a portion of the mechanism removed to more clearly disclose some of the mechanism embodying the invention,

Fig. 4 is a vertical sectional view taken upon line 4—4 of Fig. 3,

Fig. 5 is a vertical sectional view taken at right angles to the sectional view disclosed in Fig. 4,

Fig. 6 is a detail view disclosing the interior of the clutch structure embodied in the invention,

Figs. 7 to 10, inclusive, are perspective detail views of various elements employed as a part of the mechanism.

Figure 11 is an elevational view of a detailed portion of the spacing mechanism, and

Figure 12 is a perspective detailed view of one of the elements shown in Fig. 11.

In the drawings, wherein for the purpose of illustration is shown the preferred embodiment of the invention, the numeral 10 is employed to designate in its entirety a portion of the frame of the machine with which this spacing mechanism is associated. As pointed out above, this mechanism may be employed on any type of machine where a periodic or step by step movement is desired and particularly where such movement is rotary. In view of the fact that the mechanism is especially adapted for use as a driving means for the platen carrying shaft of a typewriter, the frame portion 10 in the illustrated embodiment of the invention consists of a portion of one end of a typewriter frame.

Suitably journaled in the frame 10 is the platen carrying shaft 11 which projects beyond the

frame sufficiently to accommodate the spacing mechanism disclosed herein. On the outer extremity of the shaft 11 an operating knob 12 is secured by means of set screws 13. The hub portion 14 of the knob has projecting axially therefrom diametrically opposed fingers 15 adapted for being received within notches 16 formed in the hub portion 17 of what will be termed an aligning disk 18. The use of this disk will be more completely disclosed at a later point. Screws 19 are employed for connecting the aligning disk 18 to the clutch hub 20. The aligning disk with its tubular hub extension 17 and the clutch hub 20 are freely mounted upon the end portion of the shaft 11 but are positively secured thereto by means of the connection between the hub 14 of the knob 12 and the extremity of the shaft.

The clutch hub 20 is provided with an annular flange 21 at one end and an annular groove 22 at its other end, the said groove being formed by a reduced portion of the hub which is walled at its outer side by the periphery of the aligning disk 18. The annular groove 22 is employed for rotatably receiving the radially extending web portion 23 of the clutch drum which will be designated in its entirety by the reference character 24. This drum is provided with an annular peripheral portion 25 which encircles the periphery of the clutch hub 20 to form therewith an annular space 26.

Figs. 5 and 6 disclose this space 26 as having positioned therein a plurality of segments 27, 28, 29 and 30. The segments 27 and 28 are identical and are disclosed in detail in Fig. 10. Each segment includes an aperture 31 and a chamfered inner edge 32. The chamfered portion 32 accommodates the annular flange 21 formed on the inner end of the clutch hub 20 and functions to retain the segments within the annular space 26. The segments 29 and 30 are identical and one of the same is illustrated in Fig. 9 as including a chamfered edge 33 and a hole 34 drilled therethrough so as to cut the outer arc of the segment at about one-eighth of the diameter of the hole. A small socket 35 also is formed in each one of these segments 29 and 30. The chamfered edges 33 function in the same manner as the similar edges of the segments 27 and 28 and all of the segments are intended to be made of a size to allow approximately .001 of an inch clearance to permit free sliding movement of the same within the annular space 26.

Secured to the frame 10, as by means of screws 36 passing through spacing members 37, is a mounting plate 38. This plate has projecting from the outer face thereof a rigid pin 39 which enters the aperture 31 in the segment 27 whereby the segment is locked against movement with respect to the hub and drum members 20 and 24 and all of the remaining segments 28 to 30 inclusive. For this reason, the segment 27 will be termed a fixed stop segment.

Rotatably mounted upon the shaft 11 outwardly of the mounting plate 38 is the hub portion 40 of an adjustment lever of substantially bell crank formation, the said lever being designated in its entirety by the reference character 41. The shorter arm 42 of this bell crank lever is provided with a pin 43 adapted to be positioned within the aperture 31 formed in the segment 28. By rotating the bell crank lever 41, the segment 28 may be controllably adjusted with respect to the clutch hub and drum and also with respect to the fixed stop segment 27. For this reason, the segment 28 will be termed an adjustable stop segment.

Figs. 5 and 6 disclose the segments 29 and 30 as being positioned within the annular space 26 adjacent to each other and between the fixed and adjustable stop segments 27 and 28. It will be understood, therefore, that by adjusting the segment 28 with respect to the segment 27, the portion of the space 26 in which the segments 29 and 30 are mounted may be lengthened or shortened. This feature of construction is of considerable importance and will be more completely explained at a later point.

In view of the importance of the adjustability of the stop segment 28, it is necessary to provide holding means for the adjusting bell crank lever 41. The upper offset end 44 of this lever is provided with an enlarged end 45 having a recess 46 within which is mounted a spring pressed detent 47. An operating knob 48 is connected to the outer end of the stem formed on the detent. This detent is intended to cooperate with retaining means disclosed assembled in Figs. 3 to 5, inclusive, and in detail in Figs. 7 and 8.

The plate 49 has an arcuate section 50 formed with projecting apertured ears 51 at each end and by means of which the plate is secured to a portion of the frame 10 in the manner best illustrated in Figs. 3 and 5. The sector shaped portion 50 of this plate is provided with an elongated slot 53 and an angularly extending apertured ear 54 which depends from the plate. A second plate 55 is provided and includes a sector shaped portion 56 adapted to be slidably interposed or positioned upon the sector shaped portion 50 of the plate 49. A side flange 57 is carried by the sector shaped portion 56 and is formed with a vertically extending notch 58 adapted for overlying the ear 54. The width of this notch is almost equal to the width of the apertured ear 54. A series of apertures 59 are formed in the sector shaped portion 56 of the plate 55 and are positioned to register with the elongated slot 53 formed in the plate 49. Rivets 60 pass through the end apertures in the series of apertures 59 and also through the slot 53 for the purpose of slidably connecting the plate 55 to the plate 49.

Journaled in the aperture 54a of the ear 54 is an eccentric 61. The periphery of the eccentric engages the wall of the notch 58 formed in the plate 55 and by rotating this eccentric, through the medium of a handle 62, the plate 55 may be adjusted with respect to the plate 49. Due to this form of adjusting mechanism, the movement of the plate 55 may be infinitely small and is limited only by the vision of the operator.

The detent 47 is adapted to be received within any one of the apertures 59 and may be removed therefrom, to permit adjustment of the lever 41, by pulling upwardly upon the detent through the medium of its operating knob 48.

The segments 29 and 30 will be termed locking segments in view of the fact that they are employed for locking the clutch hub 20, the clutch drum 24, and the particular segment in operative relation to each other and to the platen shaft 11 so that all of these elements may be rotated as a unit. Positioned within each one of the holes 34 in the segments 29 and 30 is a locking pin 63 which is of substantially the same diameter as the hole and the portion of the pin which protrudes beyond the arc of the segment should be ground off or cut away to correspond with the curvature of said segment arc. Each one of these pins 63 has connected thereto a curved

arm. For the purpose of distinguishing these arms, one will be designated as 64 while the other one will be designated as 64*a*. These arms project upwardly on opposite sides of the shaft 11 and between the inner end portion of the lever 41 and a spring pressed spacing member 65 (see Fig. 4). The upper ends 66 and 67 of the arms extend in parallelism and are located relatively close to the retaining means for the lever 41.

It will be understood that if the arm 64 is moved by means of a force applied tangentially to the end portion 66 that the arm will move to rotate the pin 63 connected to the lower end of the same. This rotation of the pin 63 will function to lock the pin to the periphery of the drum 24 and the segment 29 to the drum hub 20. Further pressure upon the arm 64 will cause the clutch drum and hub to rotate as a unit with the segment 29. Due to the previously described connection between the shaft 11 and the clutch drum hub 20, the said shaft also will rotate. The adjustable stop segment 28 will not rotate with the clutch drum and hub and as soon as the segment 29 engages the segment 30, rotation of the clutch mechanism and the platen shaft will be stopped. It will be understood that pressure applied to the arm 64*a* will result in the rotation of the clutch drum and hub with the shaft 11 in the opposite direction and until the segment 30 engages the segment 29.

For the purpose of providing means for applying pressure to the arms 64 and 64*a*, a bell crank operating lever 68 is pivotally mounted upon a plate 69 by means of the pin 70. In the present embodiment of the invention, the plate 69 is secured to the typewriter frame 10 by means of screws, or the like, 71. The actuating arm 72 of the lever 68 is guided in its movement by the portion 73 of the typewriter frame. This portion of the frame usually receives the ordinary platen spacing lever. The lever 68 has an arm 74 which is loosely positioned within a slot 75 formed in a slide bar 76. This bar is slidably supported by the frame 10. A laterally and downwardly projecting arm 77 is carried by the slide bar 76 and has suitably secured to its lower end a horizontally extending pin 78. This pin is interposed in the space between the upper ends 66 and 67 of the arms 64 and 64*a* respectively. It will be understood that by pivoting the lever 68 to the left of the machine represented by the portion of the frame 10, one of the arms will be moved for rotating the platen shaft in the direction to retard the paper fed by the platen. Movement of the lever to the right will cause the second arm to be actuated for advancing the paper within the machine. The arms 64 and 64*a* have connected to their upper end portions a spring 79 which functions to retain the arms in contact with the pin 78 and the hub 40.

It oftentimes becomes necessary for an operator to rotate the platen without regard for advancing the paper a certain number of spaces. For instance, an operator may find it necessary to turn back the paper to make an insertion in a previously typed portion of a letter. This rotation of the platen shaft without regard for spacing is accomplished by turning the shaft through the medium of the operating knob 12. After an insertion or correction is made by such a movement of the platen, the operator will want to return the paper to the line being typed at the time the change is made. For this reason, some form of alignment mechanism is necessary. The periphery of the clutch drum has encircling the same a brake band 80 having a lining 80*a* which is held in place upon the drum by ears 81. One of these ears carries a radially extending pin 82 which enters a notch formed in the arm 83 carried by the mounting plate 38. This engagement of the pin 82 with the arm 83 prevents rotation of the brake band 80 with the clutch drum. Ears 84 are formed on the opposite ends of the brake band and have passed therethrough a bolt 85 connected at one end to a cam lever 86 and having a knurled nut 87 threaded on its remaining end. An expanding spring 88 encircles the bolt 85 between the brake band lugs 84. The brake band may be adjusted with respect to the clutch drum by means of the nut 87, while the cam 86 may be employed for quickly loosening and tightening the band with respect to the drum. It is to be understood that the brake band should be tightened only sufficiently so that when the lever 86 is in its normal or band tightening position, the drum will be permitted to rotate when the lever 68 is actuated but will not be permitted to rotate when the platen shaft is rotated by means of the knob 12. This action of the brake mechanism assures proper return of the paper for alignment of the line being typed after the paper has been moved by the knob 12 for making an insertion or correction in a previously typed line, or for any other reason. The aligning disk 18 is formed with diametrically opposed notches 89 while pawls 90 are pivotally mounted on the radial web portion 23 of the clutch drum. A spring 91 functions to hold the free end portions of the pawls in engagement with the aligning disk. The manner in which the spacing mechanism embodying this invention may be operated for properly controlling the platen shaft now will be described:

Should an operator desire to type on lined or ruled paper with the typed lines registering with the lines on the paper, the brake band 80 should be released by throwing up the cam 86. This will permit the clutch drum and hub to rotate with the platen shaft 11. The knob 12 should be employed for rotating the shaft. The paper, after having been placed in engagement with the platen, will be advanced into the machine by rotating the operating knob 12, in the usual manner, or in a counter-clockwise direction as viewed in Fig. 2. The paper should be advanced until the second ruled line is properly positioned with the type gauge on the machine. The operator then should judge whether the lines on the paper are spaced approximately one standard space, two standard spaces, or three standard spaces. After this fact has been determined roughly, the operator should lift the detent 47 by means of its knob 48 and move the bell crank 41 until the detent will register with one of the apertures formed in the plate 55. It will be noted that seven apertures 59 are provided in this plate. Rivets 60 occupy the two end apertures and the five remaining apertures are intended to represent the usual three single standard spacing adjustments and two intermediate adjustments. To more clearly describe these apertures, the first, third and fifth apertures of the middle five represent the three usual single space adjustments, while the second and fourth apertures represent two intermediate adjustments. If the operator has determined that the lines on the paper or form being used are spaced approximately two standard single spaces, the detent 47 should be positioned in the middle one of the five apertures. It will be remembered that this shifting of

the lever 41 has caused the adjustable stop segment 28 to be moved away from the fixed stop segment 27, thereby lengthening the space in which the locking segments 29 and 30 are positioned. With the paper positioned so that the second ruled line registers with the type gauge of the machine and with the adjustment lever 41 positioned so that its holding detent is locked in the middle aperture, movement of the lever 68 in either direction will cause the platen shaft to be rotated for moving a platen mounted thereon sufficiently to shift the paper two standard spaces. By shifting the lever 68 to the left of the frame 10, the locking segment 30 will be connected to the clutch frame and held through the actuation of the arm 64*a*. By moving the lever 68 to the full extent of its throw, the paper will be carried back so that the first line will either exactly register with the typing gauge on the machine or it will closely approach the said gauge. The lever 68 should be retained in its shifted position, that is, at the end of its throw to the left, and the arm 62 which controls the eccentric 61 then should be moved to cause its eccentric to shift the plate 55 with respect to the plate 49. The detent 47 remains in the middle aperture during this adjustment. The movement of the plate 55 will cause an equivalent movement of the lever 41 and the adjustable stop segment. This adjustment by means of the eccentric 61 should continue until the first ruled line of the form will register with the typing gauge of the machine. After this adjustment has been accomplished, the operator may release the lever 68 so that it will return to its neutral position, as illustrated in Fig. 1. The brake band adjusting lever 86 then should be returned to its original position, as illustrated in the various figures. Any further movement of the lever 68 in either direction will cause the paper mounted in the machine to be advanced or retarded a distance equal to the spacing of the lines on said paper.

Should the operator desire to feed the paper backwardly, that is, so that a previously typed line may be corrected or an insertion made therein, the platen shaft should be rotated by means of the knob 12. Due to the fact that the brake band is frictionally engaging the periphery of the clutch drum, the said drum will not rotate with the platen shaft. The alignment disk 18 will rotate with the shaft and the notches 89 will be moved out of register with the pawls 90. The said disk may be rotated substantially one-half of the complete revolution before the aligning pawls will again occupy the notches 89. After the correction or insertion has been made, the operator may rotate the platen shaft in the proper direction to return the paper to the position it occupied prior to the making of the insertion or correction, or a position where the last typed line will register with the typing gauge of the machine. When the paper is returned to this starting position, the pawls 90 will enter the notches 89 and will indicate that the paper is properly set or adjusted for continuing the typing.

During the normal operation of the machine, after a complete line has been typed, the operator should actuate the lever 68 for advancing the paper the desired distance or spacing.

It is to be understood that the form of this invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, we claim:

1. Mechanism of the type described including a shaft, an element fastened to said shaft, means movable into frictional gripping engagement with said element and further movable to rotate the shaft in one direction by moving the element, means movable into frictional gripping engagement with said element and further movable to rotate the shaft in the opposite direction by moving the element, a camming member for each of said aforementioned means, a separate arm for operating each of said camming members, and means common to both of said arms for first moving either arm to operate its camming member and then moving the selected arm for producing said further movement of the means actuated by the operated camming means.

2. Mechanism of the type described including a shaft, an element fastened to the shaft, a lever, means movable into frictional gripping engagement with the element for rotating the shaft and movable out of engagement with the element after the shaft has been rotated, an operating connection between the lever and said means for causing movement of the lever to produce the desired movement of the said means, said operating connection including a camming element journaled in said means for producing the frictional engaging movement of the said means, an arm supported by the camming element for operating the latter, and a slide bar connecting the arm to the lever.

3. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means engageable with the drum for causing said segment to be connected to the hub and for rotating the shaft therethrough, means for moving the shaft and hub independently of the drum, and means for holding the drum against movement when the shaft and hub are rotated independently thereof.

4. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, and means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub and means for operating the cam.

5. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, and means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, and means for operating the arm.

6. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, and means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the

drum for forcing the segment against the hub, an arm connected to the cam, a slide bar connected to the arm, and means for operating the slide bar.

7. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, and means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, a slide bar connected to the arm, and a lever for operating the slide bar.

8. Mechanism of the type described including a shaft, a hub mounted on the shaft, an operating knob fastened to the shaft and connecting the shaft and hub, a drum loosely mounted on the hub, means for rotating the shaft through said hub, aligning means carried partly by the drum and partly by the hub, and means for preventing rotation of the drum when the shaft is rotated by the knob.

9. Mechanism of the type described including a shaft, a hub mounted on the shaft, an operating knob fastened to the shaft and connecting the shaft and hub, a drum loosely mounted on the hub, means for rotating the shaft through said hub, aligning means carried partly by the drum and partly by the hub, and a brake for preventing rotation of the drum when the shaft is rotated by said knob.

10. Mechanism of the type described including a shaft, a hub mounted on the shaft, an operating knob fastened to the shaft and connecting the shaft and hub, a drum loosely mounted on the hub, a clutch member positioned between the hub and drum, means for moving the clutch member into gripping engagement with the hub and rotating the shaft through said engagement, aligning means carried partly by the drum and partly by the hub, and means for preventing rotation of the drum when the shaft is rotated by said knob.

11. Mechanism of the type described including a shaft, a hub mounted on the shaft, an operating knob fastened to the shaft and connecting the shaft and hub, a drum loosely mounted on the hub, a clutch member positioned between the hub and drum, a camming pin connected to the clutch member, means for operating the pin to move the clutch member into gripping engagement with the hub and for rotating the shaft through said engagement, aligning means carried partly by the drum and partly by the hub, and means for preventing rotation of the drum when the shaft is rotated by said knob.

12. Mechanism of the type described including a shaft, a hub fastened to the shaft, a drum loose on the hub, said hub and drum cooperating to form an annular space between them, spaced stop segments positioned in said annular space, a clutch member positioned in said space between the segments, and means for moving the clutch member into gripping engagement with the hub and for moving the clutch member between the segments for rotating the shaft.

13. Mechanism of the type described including a shaft, a hub fastened to the shaft, a drum loose on the hub, said hub and drum cooperating to form an annular space between them, spaced stop segments positioned in said annular space, a clutch member positioned in said space between the segments, means for moving the clutch member into gripping engagement with the hub and for moving the clutch member between the segments for rotating the shaft, and means for relatively adjusting the segments to vary the extent of rotation of the shaft.

14. Mechanism of the type described including a shaft, a hub fastened to the shaft, a drum loose on the hub, said hub and drum cooperating to form an annular space between them, spaced stop segments positioned in said annular space, a clutch member positioned in said space between the segments, means for moving the clutch member into gripping engagement with the hub and for moving the clutch member between the segments for rotating the shaft, means for relatively adjusting the segments to vary the extent of rotation of the shaft, and adjustable holding means for the last mentioned means.

15. Mechanism of the type described, including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, and means for operating the cam; and means engageable with the segment for limiting the extent of rotation of the shaft.

16. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, and means for operating the cam; means engageable with the segment for limiting the extent of rotation of the shaft, and adjustable means for supporting said last mentioned means.

17. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, and means for operating the arm; and means engageable with the segment for limiting the extent of rotation of the shaft.

18. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, and means for operating the arm; means engageable with the segment for limiting the extent of rotation of the shaft, and adjustable means for supporting said last mentioned means.

19. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said

hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, a slide bar connected to the arm, and means for operating the slide bar; and means engageable with the segment for limiting the extent of rotation of the shaft.

20. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, a slide bar connected to the arm and means for operating the slide bar; means engageable with the segment for limiting the extent of rotation of the shaft, and adjustable means for supporting said last mentioned means.

21. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, a slide bar connected to the arm and a lever for operating the slide bar, and means engageable with the cam for limiting the extent of rotation of the shaft.

22. Mechanism of the type described including a shaft, a clutch hub fastened to the shaft, a clutch drum rotatably supported by the hub, a clutch segment loosely interposed between said hub and drum, means for causing said segment to be connected to the hub and for rotating the shaft therethrough, said means including a cam interposed between the segment and the drum for forcing the segment against the hub, an arm connected to the cam, a slide bar connected to the arm, and a lever for operating the slide bar; means engageable with the segment for limiting the extent of rotation of the shaft, and adjustable means for supporting said last mentioned means.

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