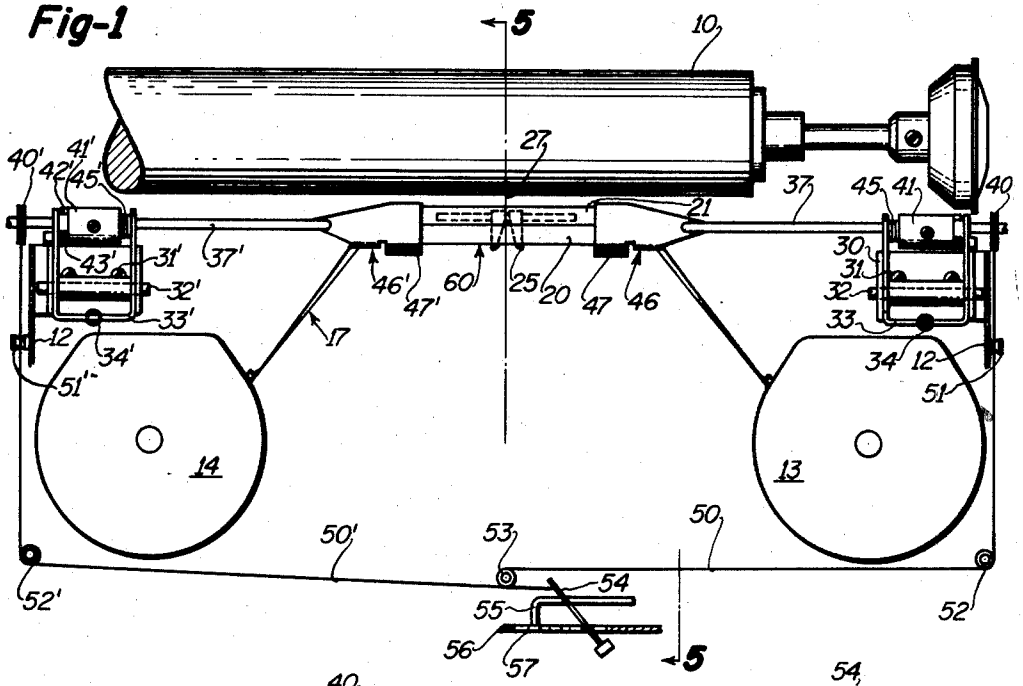
June 21, 1960 A. D'ONOFRIO ET AL 2,941,646

RIBBON ARRANGEMENT FOR BUSINESS MACHINES

Filed March 10, 1959 2 Sheets-Sheet 1

Fig-1



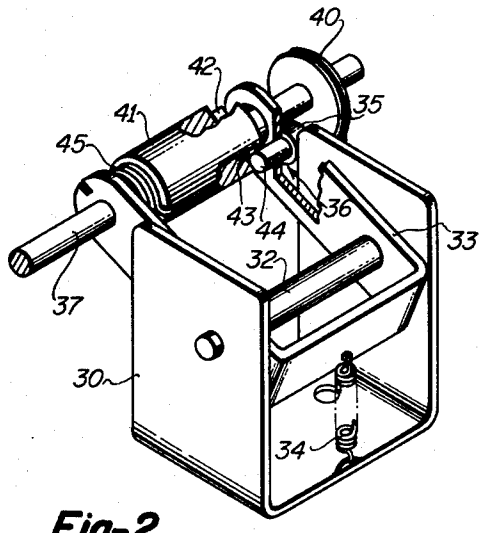


Fig-2

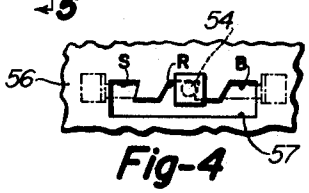


Fig-4

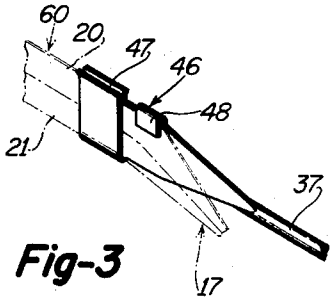


Fig-3

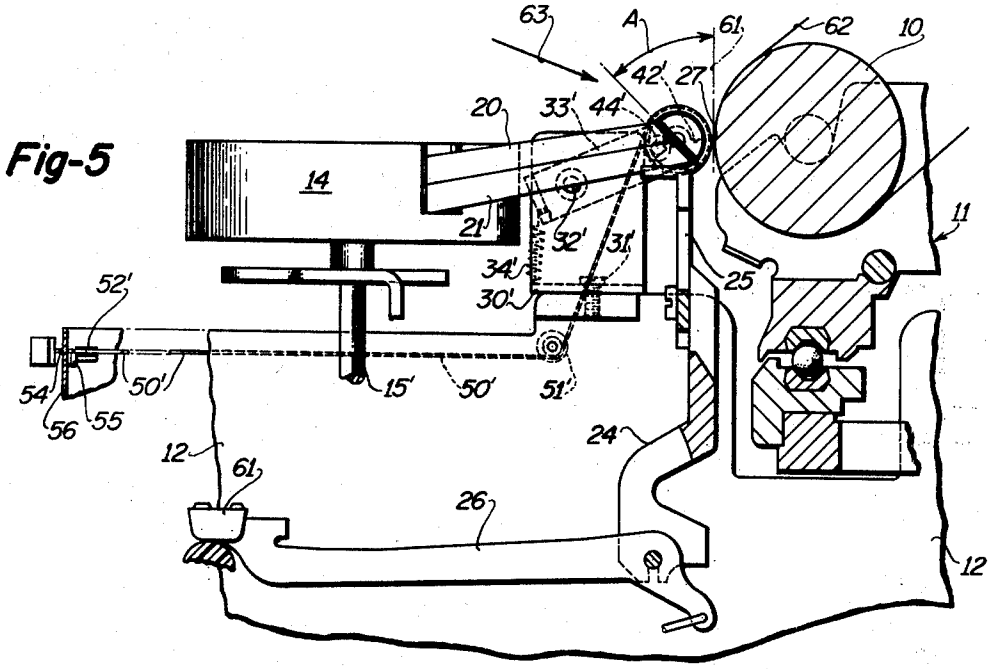
INVENTORS
ANTHONY D'ONOFRIO
LOUIS CETRAN
LLOYD J. LAPOINTE
BY Thomas L. Rose
Albert W. Scribner
ATTORNEYS

June 21, 1960 A. D'ONOFRIO ET AL 2,941,646

RIBBON ARRANGEMENT FOR BUSINESS MACHINES

Filed March 10, 1959 2 Sheets-Sheet 2

Fig-5



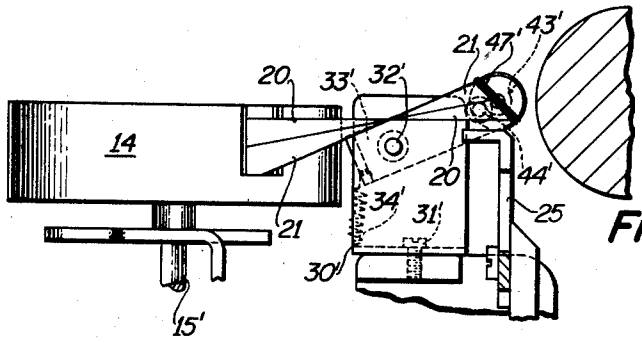


Fig-6

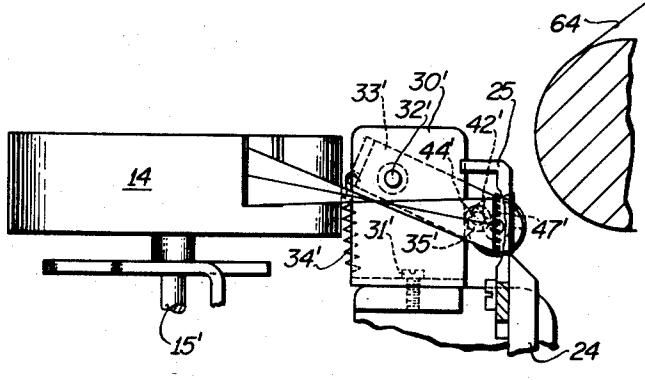


Fig-7

INVENTORS
ANTHONY D'ONOFRIO
LOUIS CETRAN
LLOYD J. LAPOINTE
BY Thomas S. Rose
Robert W. Scribner
ATTORNEYS

United States Patent Office

2,941,646

Patented June 21, 1960

2,941,646

RIBBON ARRANGEMENT FOR BUSINESS MACHINES

Anthony D'Onofrio, West Hartford, Louis Cetran, Newington, and Lloyd J. Lapointe, Manchester, Conn., assignors to Royal McBee Corporation, Port Chester, N.Y., a corporation of New York

Filed Mar. 10, 1959, Ser. No. 798,369

9 Claims. (Cl. 197—157)

This invention relates to a novel disposition and arrangement for the printing ribbon of a business machine and more particularly relates to a new and improved manner of and means for operatively supporting and guiding an inked ribbon in a typewriter.

In conventional typewriters having the usual complement of type bars pivotally mounted in an arcuate segment, each type bar is adapted to be moved towards and away from a common printing point. As each type bar swings upwardly towards said printing point a ribbon vibrator elevates an inked ribbon to a printing position wherein a portion of said ribbon overlies that part of the record sheet which is to be typed on. When any given type bar strikes said inked ribbon a small amount of the pressure sensitive ink therein is transferred onto the record sheet so as to print a desired character. After each printing operation the type bar and ribbon vibrator are restored to their respective normal positions. As said type bars successively partake of their respective printing strokes the ribbon vibrator is correspondingly elevated and lowered so as to permit "visible typing"; hence during normal typing operations the ribbon, the ribbon vibrator and all the related parts must be vertically reciprocated at relatively high speeds.

There is a considerable amount of mechanical linkage required to operate the ribbon vibrator and such not only contributes to production and maintenance costs but also tends to increase the operational noise level of the machine. Furthermore conventional ribbon vibrators require the provision of means for positively vertically securing the ribbon therein in that it is imperative that the ribbon closely follow the high speed reciprocating motion of the vibrator.

The instant invention contemplates overcoming the above noted mechanical and/or operational shortcomings and difficulties inherent in or associated with the use of a ribbon vibrator by simply eliminating the need for and use of such a device.

One object of the invention is to provide an improved arrangement and orientation for an inked ribbon in a typewriter.

Another object of the invention is to provide a stationary ribbon support and guide arrangement which is adapted to position and hold the operative portion of the ribbon immediately adjacent the printing point of a typewriter.

Another object of the invention is to provide a novel orientation for the inked ribbon in a typewriter whereby the operative portion of said ribbon is normally disposed immediately in front of but at an angle to the vertical printing plane of the typewriter.

A further object of the invention is to provide a stationary support and guide arrangement for a typewriter ribbon whereby the operative portion of said ribbon is swingably moved to a printing position by the action of a moving typebar and is restored to a normal position by the action of the ribbon feed mechanism.

Still another object of the invention is to provide an

improved normally stationary ribbon guide and positioning means which may be adjustably set to alter the normal position of said ribbon in the typewriter.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

Fig. 1 is a plan view showing the instant ribbon support and guide arrangement.

Fig. 2 is a fragmentary perspective view of one portion of said ribbon support and guide means.

Fig. 3 is a fragmentary perspective view of another portion of said ribbon support and guide means.

Fig. 4 is a fragmentary front elevational view of the ribbon adjusting control means.

Fig. 5 is a vertical sectional view taken along line 5—5 of Fig. 1.

Figures 6 and 7 are active views of the parts illustrated in Fig. 5.

Referring to Figs. 1–5, a cylindrical platen **10** is rotatably mounted in a laterally movable carriage **11** which is supported on the typewriter frame **12**. Mounted on the upper front portion of said frame is any suitable type of inked ribbon and a means for longitudinally feeding the same which, for example, may comprise a pair of ribbon spool supporting cartridges **13** and **14** each having a rotatably mounted ribbon spool therein adapted to be engaged and rotatably driven by an associated drive pin such as illustrated at 15^1 of Fig. 5. An inked ribbon **17** having an upper black portion **20** and a lower red portion **21** is adapted to be intermittently and longitudinally fed back and forth between the said two spools in the usual manner. Cooperatively mounted beneath each of the cartridges **13** and **14** is any suitable type ribbon reverse mechanism which when actuated is operative to change the direction of longitudinal feed of said ribbon **17**. The segment **24** operatively supports a type guide **25** and the usual complement of type bars such as that illustrated at **26**, Fig. 5. The construction and operation of the above described apparatus is entirely conventional in nature and may, for example, be similar to that presently incorporated in the typewriters now produced and marketed by the Royal McBee Corporation.

In combination with this conventional structure there is provided a new and improved means and arrangement for supporting and guiding the inked ribbon **17** as it progressively moves towards and away from the printing point **27**, Fig. 1, of the typewriter. The means for supporting and guiding the ribbon **17** on the right side of the typewriter between the cartridge **13** and the type guide **25**, is correspondingly the same as that for the left side of the typewriter between type guide **25** and cartridge **14**; hence only one, the former, of such means need be discussed in detail here. Referring to Figs. 1 and 2 a U-shaped bracket **30** is fixedly secured to the typewriter frame **12** by any suitable means such as screws **31**, said bracket being disposed just to the rear of the right hand spool supporting cartridge **13**. A shaft **32** mounted on bracket **30** rotatably supports a bail **33** which is rotatably biased in a clockwise direction, as seen in Fig. 2, by means of a spring **34** operatively secured between the adjacent portions of the bail **33** and bracket **30**. The two limits of oscillatory motion of bail **33** are determined by engagement of the headed portion **35** of a stud **36** fixed to one arm of the bail and the rearward edge of the adjacent leg of bracket **30**. The free ends of the arms of bail **33** pivotally support a shaft **37** to the outer portion of which is fixed a pulley **40**,

Rotatably secured to shaft 37 is a bushing 41 having a pair of stop shoulders 42, 43 which are formed at one end thereof and which cooperate with the shank portion 44 of said stud 36. A torsion spring 45, the ends of which are respectively rotatably secured to one end of the bushing 41 and the adjacent bail arm, serves to normally rotatably bias shaft 37 in a counter clockwise direction, as seen in Fig. 2, so that the stop shoulder 43 engages the stud shank 44. The stop shoulder 42 is oriented so as to engage the stud shank 44 after shaft 37 has rotated through 180 degrees in a clockwise direction from its normal rotative position as seen in Fig. 2. The inner end of shaft 37 is formed with a ribbon engaging portion 46 comprising a U-shaped ribbon receiving member 47 and a bent over ear 48 that is adapted to laterally retain the ribbon 17 in the trough of said member 47. The closely spaced leg portions of the U-shaped member 47 frictionally engage and yieldably restrain the longitudinal movement of the ribbon 17 to a very slight degree. The axis of shaft 37 passes through the color division line of that portion of the ribbon which is passing through the trough of the U-shaped member 47.

In order to rotate the shaft 37 a cable 50 of nylon, or similar material, is secured to and wound around the periphery of the pulley 40 and extends forwardly so as to pass over the pulleys 551, 52 and 53 which are respectively rotatably supported on the typewriter frame by any suitable means. The forward end of cable 50 is secured to the inner end of a color adjustment lever 54 that is pivotally mounted on a bracket 55, Figs. 1 and 5 mounted on the inner side of the front panel 56 of the typewriter. Lever 54 extends through a slot 57 formed in said front panel 56 and is adapted to be laterally restrained from partaking of a counter clockwise rotation as seen in Fig. 1, by being placed in either of the three slightly undercut notches S, R and B, Fig. 4, formed along the upper edge of said slot 57.

As mentioned above the means for supporting and guiding the ribbon between cartridge 14 and the type guide 25 corresponds to that just described for supporting and guiding the ribbon between the cartridge 13 and the type guide 25; the corresponding parts as shown in the drawings having corresponding prime reference numerals. The two 180 degree rotative positions of the shaft 37^1 are located so that the trough of the U-shaped member 47^1 is, in both cases, substantially coplanar with the trough of said member 47 when the shaft 37 is in its said two respective rotative positions. The normal rotative positions for said shafts 37 and 37^1 are such that both of said troughs, together with the portion 60 of the ribbon 17, Figs. 1 and 3, extending therebetween, are disposed at an angle A of approximately 50 degrees with respect to the vertical printing plane 61, Fig. 5, of the typewriter. The size of angle A is preferably in the range of 35 and 65 degrees.

During normal typing operations the ribbon supporting and guiding members 47 and 47^1 remain fixed or stationary in their normal Fig. 1 positions so that the upper or black portion 20 of the ribbon portion 60 is held in operative relation to said printing point 27, as illustrated in Fig. 5, i.e. in the operative paths of travel of the respective type heads such as 61. The cable 50^1 after passing over pulleys 51^1 and 52^1 is also secured to the inner end of the color adjusting lever 54. The torsion springs 45, 45^1 tend to bias lever 54 in a counterclockwise direction, as seen in Fig. 1, so that when said lever is disposed in the notch B, Fig. 4, the stop shoulders 43, 43^1 are in engagement with the stud shanks 44, 44^1 and the ribbon is held in said 50 degree angle position as illustrated in Fig. 5.

In operation when any of the type bars, such as 26, have been actuated and are near the end of their respective forward strokes the operative part of each type head will engage the said ribbon portion 60 and will swing the latter towards the printing point 27 of platen 10. When moved towards the printing point 27 by the type bar the ribbon portion 60 will become looped in a substantially horizontal plane, the added length of ribbon required here being obtained by a slight longitudinal feed movement of the ribbon off the pay-out spool. After the type head and ribbon have struck the record sheet 62, Fig. 5, supported by the platen and has thereby typed the desired character the type bar will return to its normal position on the head rest and the slack in the said looped ribbon portion caused by the just completed printing stroke will be taken up by the ensuing incremental feed movement of the ribbon take-up spool. This will restore the ribbon portion 60 to its normal position wherein it is again substantially coplanar with the trough in members 47 and 47^1. The character just typed on the record sheet 62 will be readily and completely visible to the typist in that said normal position of ribbon portion 60 is below the line of sight 63, Fig. 5, of the typist.

It will be apparent that during normal typing operations none of the instant ribbon supporting and guiding means are or need be moved: also said means are independent of the operation of said type bars. Here the movement of the ribbon to an operative position between the record sheet and the type head, which movement corresponds to the upward motion of a conventional type ribbon vibrator, is produced by the type bar itself, while movement of the ribbon to an inoperative position permitting viewing of the character typed, which movement corresponds to a downward motion of said conventional ribbon vibrator, is produced by operation of the ribbon feed mechanism of the typewriter. In this way the need for the usual ribbon vibrator is obviated thereby eliminating considerable mechanical linkage which has heretofore not only involved added costs but has also contributed to the noise level of operation of any typewriter. Furthermore in operation the ribbon portion 60 is in front of the typed line of characters for much less time than is the conventional ribbon vibrator, such permitting more effective and continued inspection of the typewritten words etc. by the typist. In the instant arrangement there are no reciprocating ribbon guiding parts which must be power driven during the usual typing operations.

When it is desired to type using the lower or red portion 21 of the ribbon 17 the shafts 37 and 37^1 are merely rotatably indexed through one half turn to their respective 180-degree positions, as illustrated in Figure 6, wherein the troughs in members 47, 47^1 respectively extend downwardly and to the rear rather than upwardly and to the front as before. This action is obtained by merely moving the lever 54 out of the notch B, Fig. 4, and placing the same in the notch R. This relocation of lever 54 serves to pull the cables 50, 50^1 so as to respectively rotate the pulleys 40, 40^1 through 180 degrees against the action of the torsion springs 45, 45^1. It should be noted here that the springs 34, 34^1 are effectively stronger than said torsional springs and hence movement of lever 54 from notch B to notch R is not accompanied by any pivotal movement of the bails 33, 33^1. When the ribbon guide and support members 47, 47^1 have been rotated through 180 degrees from their normal positions said members will remain stationary during the subsequent typing operation so as to retain the said ribbon portion 60 in such a position that the successively actuated type bars and the ribbon feed mechanism may respectively and successively move the red part 21 of the ribbon portion 60 towards and away from operative overlying relation with respect to said printing point 27.

When it is desired to type stencils the lever 54 is moved to the left, as seen in Figs. 1 and 4, and placed in notch S, Fig. 4. This movement again serves to pull cables 50, 50^1, however here after lever 54 passes notch R the stop shoulders 42, 42^1 will have engaged the stud shanks 44, 44^1 respectively and further rotation of shafts

37, 37¹ will be impossible. Thus as the lever is displaced as far as the notch S the shafts 37, 37¹ and supporting bails 33, 33¹ will be pulled downwardly against the action of springs 34, 34¹ to the position illustrated in Fig. 7. Here the ribbon guide and supporting means 46, 46¹ will be lowered so as to move the ribbon portion 60 downwardly to a position between the type guide 25 and the platen 10. When in this position, said ribbon portion 60 is located below the operative path of travel of the heads 61 of the respective type bars of the machine and hence said type bars may act directly on the stencil record sheet 64.

When it is desired to again type using the upper black portion 20 of the ribbon the lever 54 is moved to notch B, such permitting springs 34, 34¹ to elevate bails 33, 33¹ and thereafter permitting springs 45, 45¹ to rotate shafts 37, 37¹ to their said normal positions illustrated in Figs. 1 and 5.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration only and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

The invention claimed is:

1. In a business machine having a frame, a platen movably supported on said frame, a plurality of movably mounted printing elements adapted to strike said platen, an inked ribbon, and a ribbon feed mechanism adapted to longitudinally feed said inked ribbon; the improvement comprising a normally stationary ribbon guide and support means supported on said frame for retaining a portion of said ribbon in an operative position adjacent the printing point of said platen, said portion of the ribbon when being held in said operative position being disposed at an acute angle with respect to the printing plane of the machine and so as to lie in the respective paths of movement of said printing elements, and manually operable means for vertically shifting the said ribbon from its normally stationary operative vertical position to a position which is below the respective operative paths of travel of said printing elements.

2. Apparatus as defined by claim 1 wherein the size of said angle is preferably in the range of 35 to 65 degrees.

3. Apparatus as defined by claim 2 additionally comprising means for rotatably supporting said ribbon support and guide means, and means for biasing said ribbon support and guide means to a predetermined rotative position so that one longitudinal portion of said ribbon lies in the respective operative paths of travel of said printing elements.

4. In a typewriter having a frame, a platen rotatably mounted on a carriage that is movably supported on said frame, a plurality of pivotally mounted and selectively operable type bars, an inked ribbon, and a feed mechanism for incrementally feeding said ribbon in a longitudinal direction; the improvement comprising a pair of normally stationary ribbon support and guide shafts respectively rotatably mounted on said frame on either side of the printing point of said platen and being independent of the operation of the type bars of the typewriter, said shafts being formed with guide means for laterally retaining a portion of said ribbon therebetween, said ribbon portion being disposed so as to make an acute angle with respect to the vertical printing plane of the typewriter and so that one part of said ribbon portion lies in the operative path of travel of said type bars, and means for rotatably biasing said shafts to predetermined normal rotative positions.

5. Apparatus as defined by claim 4 wherein said angle lies in the range of 35 to 65 degrees.

6. In a typewriter having a frame, a platen rotatably mounted on a carriage that is movably supported on said frame, a plurality of selectively operable type bars, an inked ribbon, and a feed mechanism for incrementally feeding said ribbon in a longitudinal direction; the improvement comprising a pair of shafts mounted on said frame and adapted to be held in a stationary position during the operation of said type bars, said shafts being provided with ribbon guide members which are located and positioned in substantially coplanar relation so as to engage and laterally retain a portion of said ribbon immediately in front of the printing point of said platen and at an acute angle with respect to the vertical printing plane of the typewriter.

7. Apparatus as defined by claim 6 additionally comprising means permitting said shafts to be adjustably positioned in either of two operative positions whereby either of two longitudinal parts of said ribbon respectively lie in the operative paths of travel of said type bars.

8. Apparatus as defined by claim 7 wherein means are provided for moving said shafts to positions wherein no part of said ribbon lies in the operative paths of travel of said type bars.

9. In a typewriter having a frame, a platen rotatably mounted on a carriage that is movably supported on said frame, a plurality of selectively operable type bars pivotally supported on said frame, an inked ribbon, and a feed mechanism operative in timed relation to the actuation of said type bars for incrementally feeding said ribbon in a longitudinal direction; the improvement comprising a pair of shafts rotatably mounted on said frame, the mutually adjacent ends of said shafts being disposed adjacent the printing point of the typewriter, ribbon engaging means secured to each of said mutually adjacent shaft ends, said means being substantially coplanar and adapted to retain a portion of said ribbon therebetween at an angle of between 35 and 65 degrees with respect to the vertical printing plane of the typewriter, said ribbon engaging means remaining stationary during typing operations, and means independent of the operation of said type bars for adjusting the normal operative position of said ribbon engaging means.

References Cited in the file of this patent

UNITED STATES PATENTS

713,009	Lotterhand	Nov. 4, 1902
827,704	Briggs	Aug. 7, 1906
876,454	Heuser	Jan. 14, 1908
1,073,577	Farnham et al.	Sept. 16, 1913
1,166,805	Anderson	Jan. 4, 1916
1,273,010	Smith	July 16, 1918