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LINE SHIFT DEVICE OF ELECTRICALLY OPERATED TELE-COMMUNICATION TYPEWRITERS

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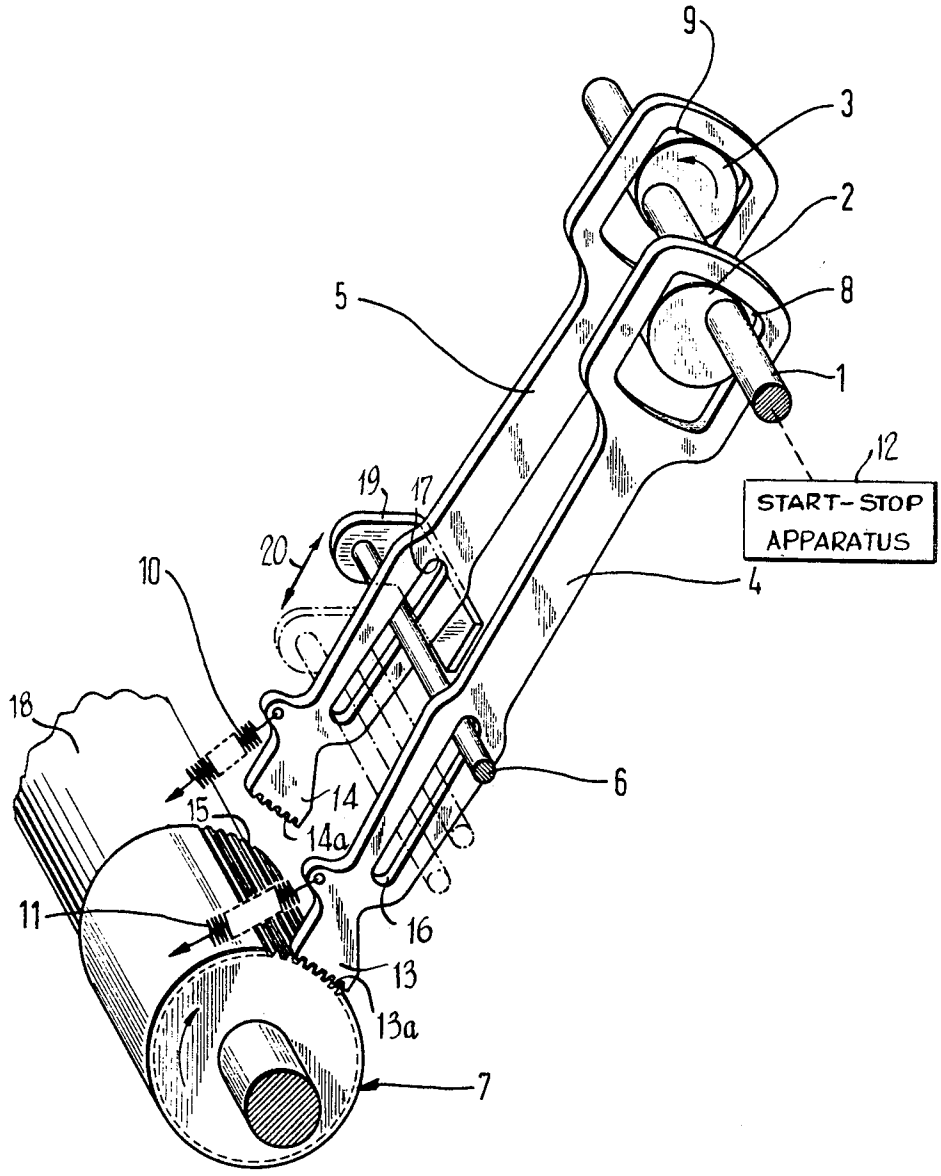

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LINE SHIFT DEVICE OF ELECTRICALLY OPERATED TELE-COMMUNICATION TYPEWRITERS

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U.S. Cl. 197—114 1 Claim

ABSTRACT OF THE DISCLOSURE

This invention is directed to a device for electrically operated typewriters, particularly of the tele-communication type and provides means for the linewise shifting of the platen roller. The shift means is engaged during the enitre operating stroke of the feeder gear of the platen roller for shifting the platen roller with a steady force to rotate the platen roller with a steady speed. The line space obtainable for each incremental rotation of the platen roller is variable by appropriate selection of the stroke of the shift means in response to the variable setting of a pair of levers which are pivotably mounted about a movable shaft which is displaceable in the direction toward the axis of a feeder gear which rotates the platen roller. The levers include gripper teeth which engage corresponding serrations or gear teeth in the feeder gear to advance the platen roller to the next line.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to a device for electrically operated tele-communication typewriters, and more particularly to a device for the rotation or linewise shifting of a platen roller associated with such typewriter. The shift means, including feeder levers, is engaged during the entire operating stroke by a feeder gear associated with the platen roller for shifting the platen roller with a steady speed of rotation. The line space obtainable at one time is adjusted by appropriate selection of the stroke of the shift means which, in turn, is responsive to a variable setting of the pivot points of the feeder levers.

Description of the prior art

Heretofore, such devices for the rotation or linewise shifting of a platen roller presently used in tele-communication machines place special emphasis on the fact that the parts to be moved are not accelerated or decelerated in a jerk-like fashion because at the high operating speed of the device a great deal of noise and vibration occurs from the co-acting parts and cause considerable wear and premature failure of the parts.

In tele-communication typewriters, according to the prior art, the line shift of the platen roller is accomplished in such a manner that the ratchet wheel (feeder gear) associated with the platen roller has the serrations thereof engaged by a second member (feeder lever). The distance of the line shift rotation of the platen roller is varied according to the desired line width in such a fashion that the feed pawl is kept disengaged from the ratchet wheel by the excess pivoting ahead of the line feed. This produces, at high operating speeds, jerk-like acceleration between the feed pawl and the serrations of the ratchet wheel. Furthermore, at high shift speeds of the platen roller it is necessary for the platen roller to be stopped at a desired position and not move beyond this position. To avoid an excess movement in the known line shifting mechanisms a detent roller is used in typewriters of the

prior art to provide the stopping effect necessary for each line shift. Therefore, the typewriters of the prior art require a high driving force to accomplish the line shift of the platen roller.

Therefore, it is advantageous for typewriters, particularly when controlled by punched tape requiring relatively high operating speeds, to vary the transmission gear for the shift ratchet (as disclosed in German Display Copy 1,033,245) in order to obtain a variable line space. As a result of these measures the platen roller can be shifted with steady acceleration movement by the shift means.

As pointed out hereinabove, it is necessary to stop the platen roller after the individual shift stroke positions the platen roller in a desired position. For that purpose, in addition to the stop rolls used, it was customary to arrange catch stops which are pressed against the feeder gear after the completion of the shift stroke, thereby preventing further rotation of the platen roller beyond the desired position. However, this arrangement is afflicted with the disadvantage that high impact stress occurs on the components of the shifting mechanism thereby increasing the wear of the components and also increasing the operating noise.

Therefore, it is advantageous to move the platen roller by a gear assuring a constant acceleration and decelerating of the platen roller. Such a line shifting device already has been disclosed in German Patent 901,433. In this arrangement, the platen roller is advanced by two grippers which alternately operate on the feed gear connected to the platen roller. However, this arrangement has the disadvantage that the use of such a gear does not offer the possibility of varying the line space.

SUMMARY OF THE INVENTION

Accordingly, the present invention is based on the problem of developing a line shifting gear device for the platen roller of an electric typewriter making it possible to utilize the entire feed stroke for the line feed of the platen roller and to decelerate the platen roller at a steady rate of speed by providing adjusting apparatus for changing the effective feed stroke to provide different line feeds.

A line shifting gear device meeting these requirements is characterized according to the present invention by the fact that a lever is pivotable on a shaft which is displaceable in a direction toward and away from the axis of the feeder gear, and positioned longitudinally in the direction of the axis of the feeder gear, and that rack teeth on the lever are arranged in the area of the feeder gear to engage the comb serrations or teeth thereon during the pivoting movement of the lever. During the feeding operation of advancing the platen roller to the next line position the lever is controlled by a cam.

With a line shifting gear device constructed in accordance with the principles of this invention the platen roller is accelerated and decelerated at a steady rate of speed, and the platen roller may be shifted any desirable angular dimension in accordance with a desired line width.

According to the preferred embodiment of the line shifting gear device of the present invention, the feeder lever is actuated by a cam which together with a bias spring provide uniform forward thrust of the feeder lever and which cam cyclically retracts the feeder lever.

The arrangement of a cam of uniform diameter offers the possibility of so controlling the feeder lever that following each feed motion it is maintained disengaged from the teeth of the feeder gear of the platen roller. The circular cam is mounted on an input driving shaft for mutual rotation therewith in a manner such that the central axis of the cam is not the axis of rotation of the cam but revolves about the input driving shaft. This makes it possible to rotate the platen roller manually when making repairs.

A preferred further development of the line feeder gear device according to the present invention is characterized by the fact that two levers are positioned pivotably on a common displaceable shaft which alternately transmit the feed strokes to the feeder gear.

Accordingly, other objections, features and advantages will be more fully realized and understood from the following detailed description when taken in conjunction with the accompanying drawing.

DESCRIPTION OF THE DRAWING

The drawing shows a somewhat perspective view of a pair of feeder levers and the associated displaceable shaft for rotating a feeder gear.

As seen on the drawing a shaft **1** is rotated by means of a start-stop gear mechanism **12** in increments of one half revolution. Two similar circular cams **2** and **3** of constant diameter are mounted on the input driving shaft **1** to form circular eccentrics by displacing their respective central axes from the axis of rotation to provide the individual cam peaks diametrically across the respective cams **2** and **3** from their connections to shaft **1**. The cam peaks are staggered with reference to one another by 180° to provide alternate driving of a platen roller **18**. A pair of feeder levers **4** and **5** have apertures **8** and **9**, respectively, formed at the ends thereof for engaging cams **2** and **3** respectively. Both feeder levers **4** and **5** are positioned pivotably on a shaft **6**, and are longitudinally displaceable in the direction toward a feeder gear **7**. The feeder gear **7** is fixedly connected to a platen roller **18** which is to be shifted in response to rotation of the feeder gear **7**. The input drive shaft **1** and the feeder gear **7** are mounted for rotation such that their axes of rotation are parallel and therefore define a plane. Shaft **6** extends through elongate slots **16** and **17** in feeder levers **4** and **5**, respectively, and lies in the aforementioned plane defined by the axes of rotation of the feeder gear **7** and the drive shaft **1**. The shaft **6** is secured to a L-shaped member **19** which is selectively operable toward and away from the platen roller **18** as indicated by the double-headed arrow **20**. The shaft **6** is therefore movable toward and away from the platen roller **18** in the aforementioned plane. Consequently, the transmission ratio of the lever arms **4** and **5** can be modified. That is, the stroke of the gear portion **13, 14** of each lever arm **4, 5** engaging the serrations or teeth **15** of the feeder gear **7** by way of teeth **13***a* and **14***a*, respectively is dependent on the position of shaft **6** within the slots **16** and **17** formed in respective ones of the levers **4** and **5**. Therefore, movement of the L-shaped member **19** and the shaft **6** provides means for adjusting the pivot point around which the levers **4** and **5** rotate. This feature provides means for adjusting the amount of feed advance of the platen roller **18**.

The cams **2** and **3** of uniform diameter are positioned in openings **8** and **9** on levers **4** and **5** respectively, thus causing the form-locking pivoting of the feeder levers **4** and **5**. During the feed stroke of feeder levers **4** and **5**, the respective teeth **13** and **14***a* of the levers **4** and **5** are held in engagement with the teeth **15** of the feeder gear **7** by corresponding springs **10** and **11**, thereby force-locking the teeth **13***a* and **14***a* of the feeder levers **4** and **5** in engagement with the teeth **15** of the feeder gear **7**. During the reverse movement, the corresponding lever **4** or **5** is pulled by its cam **2** or **3** against the force of its corresponding spring **10, 11** out of engagement with the feeder gear **7**. It is advantageous to maintain the feeder gear **7** freely rotatable during periods of non-operation to facilitate repairs of the mechanism. Therefore, when cams **2** and **3** are positioned such that the maximum extent of the cam lobes are perpendicular to the plane along the axis of shafts **1** and **6**, teeth **13***a* and **14***a* of gear portions **13** and **14** of both lever arms **4** and **5** are disengaged from the feeder gear **7**.

The two feeder levers **4** and **5** co-act with the feeder gear **7**. However, it will be understood that a single feeder lever may be used but it will be understood that after each operating stroke of the single lever it must return to its original position to be able to execute the next following operation. Therefore, when using the device of the present invention, the cams **2** and **3** of uniform diameter are so arranged that during operation of the levers **4** and **5** the lever, for example lever **4**, which advances the feeder gear **7** stays in engagement therewith until the next lever, lever **5**, moves forward, and lever **4** moves rearward thereby causing the lever **5** to advance the feeder gear **7** to the next position.

I claim as my invention:

1. Appartus for shifting a platen roller, comprising: a feeder gear axially aligned with and secured to said platen roller for mutual rotation, said feeder gear including teeth, an input driving shaft mounted for rotation, the axis of rotation of said input driving shaft and the axis of rotation of said feeder gear and said platen roller defining a plane, a feeder lever including teeth at one end thereof extending from said input driving shaft to said feeder gear, means connected to said feeder lever for urging the teeth thereof into engagement with said teeth of said feeder gear, means forming an elongate slot in said feeder lever, a second shaft extending through the elongate slot to form a pivot for said feeder lever, a cam carried on said shaft for rotation therewith, said feeder lever including cam following means at the other end thereof coupled to said cam to follow the motion thereof, the camming action reciprocally pivoting said feeder lever about said second shaft and permitting alternate engagement of said disengagement of said teeth of said feeder-lever and said teeth of said feeder gear, and means for shifting the position of said second shaft within said elongate slot and within the plane formed by the axes of said shaft and said feeder gear to thereby change the transmission ratio of said feeder lever while maintaining the same driving input to said input driving shaft.

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