United States Patent [19]

Hengelhaupt et al.

[11] **3,727,743**

[45] **Apr. 17, 1973**

[54] **CARBON RIBBON TRANSPORTING AND INSTALLATION FACILITIES**

[75] Inventors: **Hans-Georg Hengelhaupt,** 8500 Nuernberg; **Friedrich Teichmann,** 8501 Feucht, both of Germany

[73] Assignee: **Triumph Werke Nuernberg A.G.,** Nuernberg, Germany

[22] Filed: **Feb. 3, 1971**

[21] Appl. No.: **112,334**

[30] **Foreign Application Priority Data**

Mar. 7, 1970 Germany.....P 20 10 862.7

[52] **U.S. Cl.**.....**197/159,** 197/170

[51] **Int. Cl.**.....**B41j 35/10**

[58] **Field of Search**.....197/151, 170, 157–159

[56] **References Cited**

UNITED STATES PATENTS

3,548,994	12/1970	Hudson	197/151
2,919,784	1/1960	Morris	197/159
3,154,185	10/1964	Kamp	197/151
3,401,783	9/1968	Norwood et al.	197/151
3,062,351	11/1962	Canny	197/170 X

Primary Examiner—Robert E. Pulfrey
Assistant Examiner—Stephen C. Pellegrino
Attorney—Joseph R. Spalla

[57] **ABSTRACT**

In a typewriter, a pair of transport rollers are effective incidental to typing operations to advance a carbon ribbon threaded through a vibrator to pay it off over a redirecting guide roll to be wound to a spool which is under constant impositive winding urge. A ribbon control member, when operated, separates the transport rollers and also lifts the vibrator to an accessible position. Incidental thereto, a correlation of the guide roller relative to the transport feed rollers and the vibrator is established which facilitates the presentation of carbon ribbon in a straight line condition extending from said vibrator between the transport rollers and behind the guide roller. A drive control member, when operated, causes power-step-movements of the transport rollers, but an interlocking means permits operation of only one of said control member at a time. The machine includes a member to set a fabric ribbon vibrator for elevation to desired extents and when set renders the drive control member inoperable. Conversely, if the drive control member is operated, the ribbon control member is incapable of being set.

10 Claims, 5 Drawing Figures

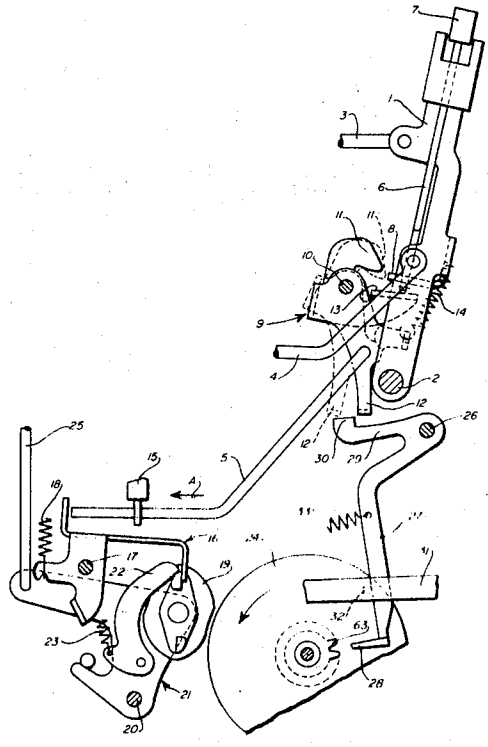

Fig_2

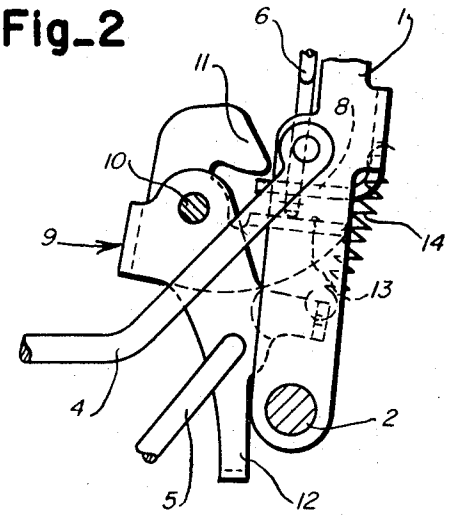

Fig_1

INVENTORS
HANS-GEORG HENGELHAUPT
FRIEDRICH TEICHMANN

BY Joseph R. Spalla
ATTORNEY

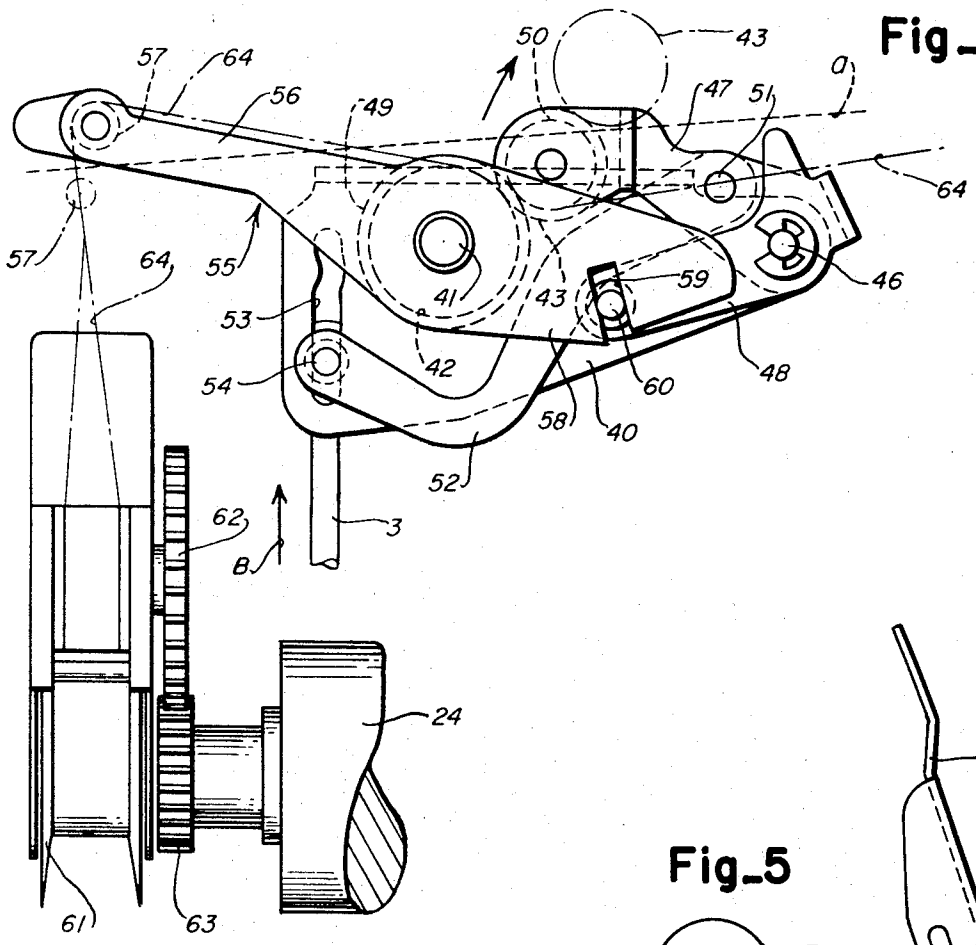

Fig_4

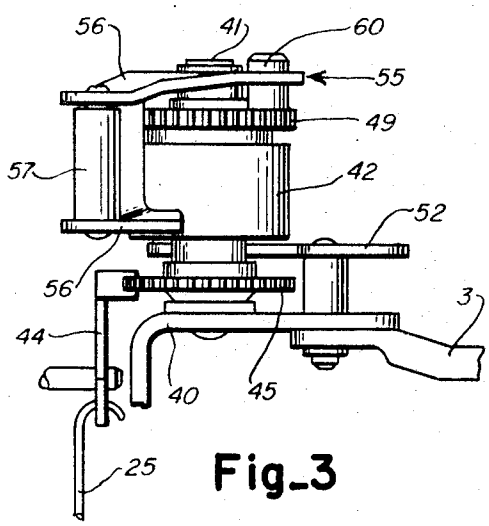

Fig_3

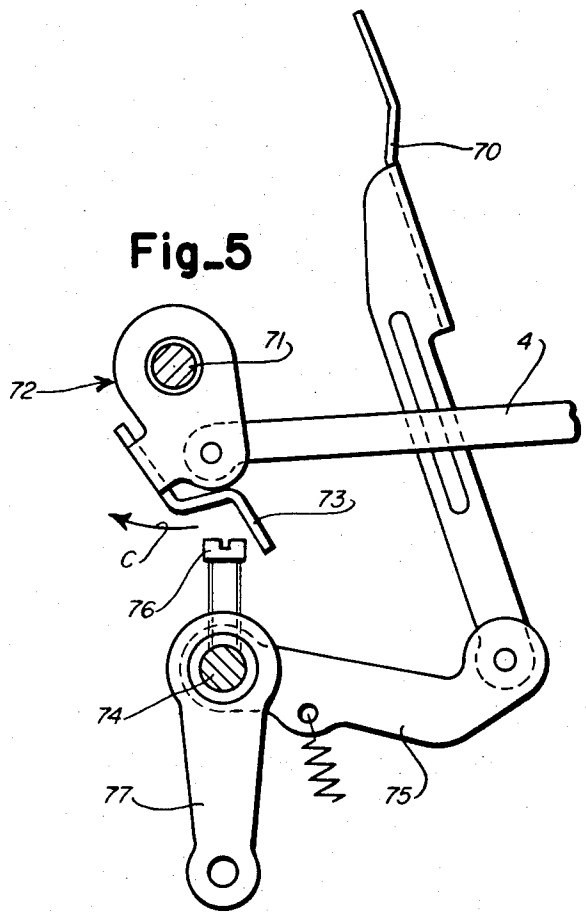

Fig_5

CARBON RIBBON TRANSPORTING AND INSTALLATION FACILITIES

BACKGROUND OF THE INVENTION

The invention relates to typewriters and similar machines which are equipped for use of carbon and/or fabric ribbon, and embody a carbon ribbon take-up spool adapted to be under a constant light winding urge by a slip clutch and embody also a pair of ribbon feed rollers for the transport of a carbon ribbon which is given feed steps by a feed pawl and which rollers are engageable and disengageable.

In connection with equipment of this kind, it is very important to be able to install the carbon ribbon conveniently, reliably, speedily and efficiently, and particularly also without entailing smudging of the operator's fingers.

It is well known in power operated typewriters to separate the feed rollers for the carbon ribbon by a lever operable mechanism in order to facilitate the placement of the ribbon into the machine. It is advantageous also to elevate the ribbon vibrator concomitantly with the separation of the feed rolls and to hold it there so that the ribbon can be placed conveniently into position thereon, see German Patent No. 463,936.

Several machines embody key controllable devices to elevate the ribbon vibrator for convenient access thereto. It has also been proposed to provide a ribbon vibrator wherein a ribbon guiding slot is afforded by a stable and movable arm and wherein by movement of the latter the slot can be opened and closed by a control lever, see German Patent No. 1,153,035.

Devices of this kind are somewhat complex in structure and also are subject to misoperation. If both of these devices are incorporated in a machine each has its own control element whereby the manipulation thereof is involved and it is difficult to accommodate such structure suitably in the machine.

SUMMARY OF THE INVENTION

It is the object of the invention to provide in a power driven typewriter or other machine having carbon or fabric ribbon accommodation, devices of the kind stated which greatly facilitate the presentation of inked ribbon thereto, and which devices eliminate the above stated disadvantages. Particularly, a control device embodies, connected to a manipulative ribbon control lever, a link having connection with ribbon feed rollers to release them, another link connected with a member to lift a ribbon vibrator, and further a link operable by a push control on said manipulative lever and which, if operated, renders a repetitive ribbon transporting drive effective. Furthermore, according to an advantageous embodiment of the invention a blocking device is arranged intermediate the push control and said link for preventing operation of said manipulative lever and becomes effective if the push control is operated while the manipulative ribbon control stand unoperated, and whereby faulty control of the ribbon transporting devices is prevented.

In order to condition the machine so that no carbon ribbon is used during stencil typing, there is provided a blocking lever which is operable by a spring under the control of a setting rod. When said blocking lever is operated an upper arm thereon blocks the before

stated blocking device against operation by blocking a down reaching extension thereof, the blocking lever at the same time, through a nose at its lower end, engages and holds a take-up spool associated pinion against rotation to prevent ribbon transport.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a left hand side elevational view showing a manipulative ribbon control lever along with different members of a carbon ribbon transporting device and a drive control mechanism therefor;

FIG. 2 is a fragmentary view showing of certain parts illustrated in FIG. 1 and with some parts moved to operated position;

FIG. 3 is a left side elevational view of a ribbon transport mechanism;

FIG. 4 is a plan view of the ribbon transport mechanism including the take-up spool and the drive therefor; and

FIG. 5 is a left sectional side elevational view showing a portion of a lifting mechanism for a ribbon vibrator.

DESCRIPTION OF PREFERRED EMBODIMENT

In a power driven typewriting machine, not generally shown, a manipulative ribbon control lever **1** is pivotally carried on a stud **2** which is carried on the machine frame and serves to call into operation certain correlated functions of a carbon transport mechanism. Three links, namely links **3**, **4** and **5** have connections with said manipulative ribbon control lever **1** to be operated thereby for activation of given element groups of a ribbon guiding transport mechanism. Link **3** serves to separate or engage ribbon transport rollers **42**, **43** see FIGS. **3** and **4**. Link **4** serves to operate a lifting mechanism for a ribbon vibrator **70**, see FIG. **5**. And, finally, link **5** serves to call into operation a repeat drive mechanism for feeding the ribbon transport rollers **42**, **43**, see FIG. **1**. The links **3** and **4** are directly connected to the manipulative ribbon control lever **1**, while for operation of the link **5** the manipulative ribbon control lever **1** carries a drive control push rod **6** headed by a push button **7**, the push rod **6** being slidably borne in the manipulative ribbon control lever **1**, by means including a guide ear **8** on the latter, so as to be movable directionally toward the pivot stud **2**. The drive control push rod **6** operates actuating means including a bell crank **9** supported pivotally on a fixed stud **10**. One arm of the bell crank **9** has upreaching therefrom a blocking means in the form of a nose **11** and also has a shelf formation **13** underlying the rod **6**, while another arm of the bell crank **9** has the link **5** connected thereto. The other arm of said bell crank **9** has on a downreaching extension **12** which is capable of blocking cooperation with a locking lever **27** which is adapted to render a drive for a ribbon take-up spool incapacitated. The bell crank **9** has a contractible spring **14** connected thereto which urges the bell crank **9** to the normal position seen in FIG. **1**, wherein the push rod **6** and its button **7** is in a raised, normal position.

The link **5** which serves to render the repeat feeding mechanism for the ribbon feed rollers **42**, **43** active, is attached to the downreaching arm of the bell crank **9**, and near its extending end is guided in an element **15**

for action on a dog 16 which is pivotally mounted on a stationary stud 17. Dog 16 under the bias of a spring 18 is normally in a position to intercept an eccentric 19 which is turnably carried on an angular lever 21 which in turn is pivotally carried on a stud 20, and the eccentric 19 has a contact surface facing a continuously driven drive roll 24. The eccentric 19 has a lever 22 continuously bearing against it which is pivotally carried on said angular lever 21 and for this purpose is under the tension of a contractile spring 23. The longer arm of the angular lever 21 has a pull rod 25 linked to it which at its upper end (FIG. 3) is connected with a ratchet pawl 44 for a ratchet wheel 45 associated with the ribbon feed roller 42.

Underneath the manipulative ribbon control lever 1, a frame supported stud 26 carries pivotally the locking lever 27 which at its lower end has a nose 28 of such shape that it can move between the teeth of a pinion 63 which normally in a conventional yielding manner tends to drive a ribbon winding spool 61. The locking lever 27 has at its upper end an arm 29 which has a tooth 30 facing upwardly counter to a downward extension 12 of the bell crank 9. In order to move the nose 28 clear of the pinion 63, a settable bichrome selector link 31 is provided which, if set as shown in FIG. 1, positions the locking lever 27 by a pin 32, against the tension of the spring 33, thereby to disengage the nose 28. The link 31 has the further purpose to effect in other positions the selection of different ribbon color zones.

FIGS. 3 and 4 show the ribbon transport rolls 42, 43, along with mounting means therefor, as well as the carbon take-up spool 61 and related drive mechanism therefor. On a fixed bracket plate 40 there is provided a spindle 41 which carries a ribbon transport roller 42. A feed pawl 44 is adapted to drive the transport roller 42 via a ratchet wheel 45 which is also carried on spindle 41. A stud 46 on the bracket plate carries a bell crank having a long arm 47 and a short arm 48, the longer arm carrying the transport roller 43 for pressure engagement with the roller 42. In order to assure positive rotation of the roll 43 the transport roller 42 has a gear 49 which normally is in engagement with a gear 50 on the roller 43 for facilitating accurate ribbon transport. On the longer arm 47 of the stated bell crank is a stud 51 whereto one end of a push rod 52 or link is connected. The other end of such push rod 52 is connected with the link 3 by a stud 54 which has guidance in a slot 53 of the bracket plate 40. On the spindle 41 which carries the ribbon transport roller 42 there is pivotally carried a ribbon guide means in the form of a two-armed lever 55 which on its longer arm 56 carries a ribbon guide roller 57 over which the carbon ribbon 64 is redirected. The shorter arm 58 of the lever 55 has a notch 59 into which there reaches a stud 60 which is carried on the bell crank arm 48.

The carbon ribbon take-up spool 61 is carried on the left side of the typewriter and is subjected continuously to a winding urge by a power roll 24 through a slip coupling which drives a pinion 63 and in turn a gear 62, the latter having connection with said spool 61.

The manipulative ribbon control lever 1 is connected with a lever 72 by the link 4, see FIG. 5. The lever 72 is pivoted on a stud 71 and has a finger extension 73. Below the lever 72 is situated a shaft 74 on which is secured an arm 77 and axially offset therefrom a lifting arm 75 for a carbon ribbon vibrator fork 70. The arm 77 is operated incidental to typing operations to lift the ribbon vibrator fork 70. On the hub of the arm 77 is a long screw 76. When the link 4 is operated by the manipulative ribbon control lever, the arm 72 with its extension 73 is operated for the latter to swing the arm 75 to lift the ribbon vibrator fork 70.

The operating functions performed under the control of the manipulative ribbon control lever 1 include the following:

When it is desired to insert a new carbon ribbon 64 into the typewriter, the manipulative ribbon control lever 1, in the aspect seen in FIG. 1, is moved leftwardly. Resultingly, by the action of the link 3, in the direction of the arrow B, see FIG. 4, the end of the link 3 which is connected to the stud 54 that is guided in the slot 53 will cause the push link 52 to operate the arm 47 so as to move and separate the pressure roller 43 from the ribbon transport roller 42. Concomitantly, as the lever arm 47 is operated, its associated lever arm 48, through the pin 60 thereon, is active in the slot 59 of the arm 58 to operate the lever 55 counterclockwise. Through such operation, there is opened a space along a straight line "*a*" indicated in FIG. 4 so that the ribbon 64 can be placed into the machine in a straight-line condition extending from the ribbon vibrator 70 between the transport rollers 42, 43 and appropriately to the rear of the ribbon redirecting guide roller 57. It is therefor unlikely for the operator to faultily thread the ribbon. After the ribbon is coursed 90° around the guide roller 57 on the lever arm 56, it is led in a 90° twist to be wound on the ribbon spool 61. Simultaneously, as the operation of the manipulative ribbon control lever 1 effects the separation of the ribbon transport rollers 42, 43 it also effects by the link 4 the operation of the lever 72 in the direction of the arrow "C," see FIG. 5. Thus, the extension 73 on the lever 72 by engaging the screw 76 swings the arm 75 and thereby elevates the ribbon vibrator 70. In such elevated position, the ribbon vibrator 70 is conveniently accessible for the threading of the ribbon 64 thereonto.

Repetitive feeding of the ribbon by the transport rollers 42, 43 results when the button 7 on the drive control push rod 6 and carried on the manipulative ribbon control lever 1 is depressed while such lever is in its normal position seen in FIG. 1. The depression of the drive control push rod 6 causes its lower end to act on the ear 13 of the bell crank 9 to rotate the latter clockwise on the stud 10 against the force of the spring 14. This causes the link 5 to be pushed against the tension of the spring 18 in the direction of the arrow "A" shown in FIG. 1 and causes the dog 16 to rock on the pivot stud 17 which therefor frees the eccentric 19 for clockwise rotation. As the eccentric 19 is so freed, a lever 22 under the tension of a spring 23 will urge it to turn clockwise to contact the constantly rotating power roll 24. Therefor, for the duration of the depression of the button 7 the eccentric 19 turns and thereby causes reciprocations of the crank 21 on the stud 20. These reciprocations are transmitted by the link 25 to the feed pawl 44 to feed the ratchet wheel 45 so that the transport rollers 42, 43 receive step motions to feed the ribbon 64. Whenever the crank 9 is rocked clockwise on its stud 10 to the dotted line position indicated in

FIGS. 1, the blocking nose 11 thereon, which forms a portion of an interlocking means moves clockwise in front of another portion of the interlocking means in the form of the ear 8 on the manipulative lever 1, as shown in dotted lines in FIG. 1. Therefor, when and while the button 7 is depressed to operated position for causing repeat ribbon transport, the manipulative ribbon control lever 1 becomes blocked against operation so that it cannot be operated to effect a separation of the feed rollers 42, 43 and also cannot lift the vibrator 70.

On the other hand, if in the normal position of the bell crank 9 seen in FIG. 1, the manipulative ribbon control lever 1 is operated from the normal position, the ear 8 on said manipulative ribbon control lever 1 serves as a stop element and moves into position under the nose 11 of the bell crank 9 and consequently the bell crank 9 and thus also the button 7 are blocked against operation. If it were possible to press the control button 7 while the manipulative ribbon control lever 1 occupied operated position and thus the ribbon transport rollers 42, 43 were separated, it would subsequently be very possible for the operator to forget to move the manipulative ribbon control lever 1 to normal position, so that the ribbon transport rollers 42, 43 would stand separated. By rendering the repetitive feed mechanism for the feed rollers 42, 43 effective there are attained various advantages. For instance, when the rollers are being engaged, the teeth of the gears 49, 50 may ride upon each other so that the feed rollers 42, 43 fail to contact and grip the ribbon, and thus the ribbon will wind wastefully on the continuously turning core of the take-up spool 61. This condition can be relieved by briefly operating the button 7 and thereby briefly rendering the repeat feed for the rollers 42, 43 effective to cause proper mesh of the gears 49, 50.

Furthermore, when after placement of the ribbon onto the vibrator 70 and after application of the feed rollers 42, 43 there is yet an uncoated ribbon portion at the vibrator, the feed for the feed rollers 42, 43 is simply activated to cause such ribbon feeding and winding of ribbon as is necessary. As a practical matter, the ribbon should not be used for typing to its end and is removed from the machine before the end is reached. The remaining portion then caused to be wound on the take-up spool through the repetitive feed mechanism for the feed rollers 42, 43.

Similarly, the repeat feed mechanism for the feed rollers 42, 43 can suitably be called into operation when the wound ribbon on the spool has grown to a large diameter and then a fracture of the ribbon 64 happens to occur, so that the beginning of the remainder of the ribbon needs to be reattached to and wound on the take-up spool. In this circumstance the winding spool 61 would have insufficient winding force to facilitate anchorage-effective self winding of the leading end of the remainder of the ribbon onto the spool, but under such condition adequate winding action of the spool can be induced by causing the feed rollers 42, 43 to be power turned under the control of the push button 7.

If instead of a carbon ribbon there is to be used a fabric ribbon or stencil typing is to be done, then the carbon ribbon transport device needs to be disabled and this is done under control of the link 31 by the left end of the latter, not shown, and further the link 31 then controls the fabric ribbon vibrator for appropriate throw. Furthermore, the link 31, when adjusted for these functions incapacitates the take-up spool 61 through the locking nose 28 of the lever 27. All this is done in response to setting the link 31 appropriately leftwardly, at which time the pin 32 on the link 31 allows movement of the lever 27 by the spring 33 to place its nose 28 into the engagement with the pinion 63. It follows then that the power roll 24 is unable to transmit motion to the pinion 63 by the stated slip clutch, not shown. The simple blocking provision including the nose 28 is made to avoid noise which would be generated by the spool 61 in the absence of installed carbon ribbon, if the spool were running idly. Moreover, the locking lever 27 incidental to effecting movement of the nose 28 into the pinion 63, moves the tooth 30 on its upper arm 29 into blocking position with respect to the downward extension 12 of the bell crank 9 of the locking device embodying the blocking nose 11. Therefor, resultant to the rotation of the lever 27 to its blocking position, the bell crank 9 becomes blocked against operation and consequently the push link 6 and the button 7 thereon becomes blocked against operation. It follows thus that whenever the take-up spool 61 is blocked against receiving winding motion, the ribbon transport rollers 42, 43 cannot be rendered active under the control of the button 7. Reversely, when blocking arm 27 is in normal position and the bell crank 9 is operated clockwise through the operation of the button 7, then the extension 12 of the bell crank 9 moves to the dotted line position seen in FIG. 1 and thereby prevents the operation of the lever 27 to move the tooth 28 into pinion blocking position. The length of the face of the tooth 30 is such that the tooth allows operation of the lever 27 only in the normal position of the bell crank 9 and its extension 12 and excludes operation of the lever 27 whenever the repeat transport of the ribbon under the control of the button 7 is in effect.

The invention claimed is:

1. In a typewriter, the combination comprising:

a ribbon vibrator for carrying a ribbon and being movable from a lowered rest position to an elevated position to facilitate the threading of a ribbon thereon,

ribbon transport means for advancing the ribbon through said ribbon vibrator,

said ribbon transport means including a pair of rollers for receiving the ribbon therebetween,

said ribbon transport means further including mounting means normally supporting said rollers in cooperating relation with each other to draw the ribbon through the ribbon vibrator and being movable to separate said rollers to facilitate the threading of the ribbon therebetween,

a ribbon control member supported for movement from a rest position to an operated position, and

moving means connected in controlling relation with said ribbon vibrator and said mounting means and being operable in response to the movement of said ribbon control member from the rest position to the operated position for moving said ribbon vibrator from the lowered rest position to the elevated position and for moving said mounting means to separate said feed rollers.

2. In a typewriter according to claim 1, the combination further comprising:

drive means for cyclically driving at least one of said rollers in intermittent steps to advance the ribbon through said ribbon vibrator,

a drive control member supported for movement from a rest position to an operated position,

actuating means operable in response to the movement of said drive control member from the rest position to the operated position for actuating said drive means to intermittently advance the ribbon through said ribbon vibrator, and

stop means associated with said ribbon control member and operable in response to the movement of said ribbon control member from the rest position to the operated position for stopping movement of said drive control member from the rest position to prevent the actuation of said drive means.

3. In a typewriter according to claim 2, the combination further comprising blocking means associated with said drive control member and operable in response to the movement of said drive control member from the rest position to the operated position for blocking movement of said ribbon control member from the rest position to prevent the operation of said moving means.

4. In a typewriter according to claim 3, said drive control member being movably supported on said ribbon control member.

5. In a typewriter according to claim 4:

said ribbon control member being in the form of a lever pivotably supported for movement between a rest position and an operated position, and

said drive control member being movably supported on said lever for operation thereon.

6. In a typewriter according to claim 1:

said actuating means including a bell crank pivotally supported in spaced relation to said ribbon control member and pivoted by the movement of said drive control member from the rest position to the operated position,

interlocking means comprising a nose movable with said bell crank and a stop element movable with said ribbon control member,

said nose being movable into blocking relation with said stop element upon movement of said drive control member to the operated position to prevent the movement of said ribbon control member from the rest position, and

said stop element being movable into blocking relation with said nose upon movement of said ribbon control member to the operated position to prevent pivoted movement of said bell crank and prevent movement of said drive control member from the rest position.

7. In a typewriter according to claim 6:

said ribbon control member being a pivotally supported lever, and

said drive control member being a plunger carried on said lever and being axially movable to operate said pivotally supported bell crank.

8. In a typewriter, the combination comprising:

a ribbon vibrator for carrying a ribbon thereon,

ribbon transport means for advancing the ribbon through the ribbon vibrator,

said ribbon transport means including a pair of rollers located forwardly of said ribbon vibrator for receiving the ribbon therebetween,

said ribbon transport means further including mounting means normally supporting said rollers in cooperating relation with each other for drawing the ribbon through said ribbon vibrator and being movable to separate said rollers to facilitate the threading of the ribbon therebetween,

ribbon guide means defining a ribbon guide portion located rearwardly from said pair of feed rollers for receiving the ribbon therefrom and redirecting the ribbon toward a take-up spool,

said ribbon guide means being movably supported for forward movement of the ribbon guide portion toward alignment with said ribbon vibrator and said pair of guide rollers upon separation thereof,

a ribbon control member supported for movement from a rest position to an operated position, and

moving means connected in controlling relation with said mounting means and said ribbon guide means and being operable in response to the movement of said ribbon control member from the rest position to the operated position for moving said mounting means to separate said feed rollers and for moving said ribbon guide portion into alignment with said separated feed rollers and said ribbon vibrator to facilitate the threading of the ribbon into a straight line condition from said ribbon vibrator through said separated feed rollers to said ribbon guide portion.

9. In a typewriter according to claim 8:

said ribbon vibrator being movable from a lowered rest position to an elevated position to facilitate the threading of a ribbon thereon, and

said moving means being further connected in controlling relation with said ribbon vibrator and operable in response to the movement of said ribbon control member from the rest position to the operated position for moving said ribbon vibrator to the elevated position.

10. In a typewriter according to claim 8:

said mounting means including a bracket rotatably supporting one of said rollers and another member rotatably supporting said other roller and being pivotably supported on said bracket for separating said roller thereon from said roller supported by said bracket,

said ribbon guide means including a lever pivotally supported on said bracket and carrying said ribbon guide portion for movement of said ribbon guide portion relative to the location of said rollers, and

said moving means operably connecting said lever of said ribbon guide means with said member supporting said roller for movement of said ribbon guide portion relative to said rollers upon movement of said roller supporting member to separate said pair of rollers from each other.

* * * * *