

[54] **PRINTING MACHINE IN WHICH THE RIBBONS IN TWO DIFFERENT CARTRIDGES MAY BE SELECTIVELY USED**

[76] Inventor: **William H. Wolowitz**, 6905 Persimmon Tree Road, Bethesda, Md. 20034

[22] Filed: **Apr. 1, 1974**

[21] Appl. No.: **457,293**

[52] U.S. Cl. .... **197/151; 197/156; 197/181**

[51] Int. Cl.<sup>2</sup> ..... **B47J 30/14**

[58] Field of Search ..... 197/151, 156, 181

[56] **References Cited**

**UNITED STATES PATENTS**

|           |         |                      |           |
|-----------|---------|----------------------|-----------|
| 3,154,185 | 10/1964 | Kamp.....            | 197/156 X |
| 3,397,767 | 8/1968  | Hobbs.....           | 197/181   |
| 3,598,220 | 8/1971  | McGrath.....         | 197/156   |
| 3,643,777 | 2/1972  | Anderson et al. .... | 197/151   |
| 3,747,734 | 7/1973  | Norman et al. ....   | 197/181   |

**OTHER PUBLICATIONS**

NASA Tech. Brief B72-10498, "Na-Err Typing Aids," Aug., 1972.

Primary Examiner—Edgar S. Burr  
Assistant Examiner—Edward M. Coven  
Attorney, Agent, or Firm—Hall & Myers

[57] **ABSTRACT**

A typewriter employs two separate ribbons held in two separate cartridges respectively. A mechanism is employed for moving either ribbon into operating position. For example, in one form of the invention a transport carries the two cartridges and may be moved to the left and right respectively to bring either ribbon into operating position. In a modified form of the invention, two backspace keys on the keyboard move the two cartridges into their respective operating positions. In another modified form, the ribbon of the first cartridge remains in operating position and the ribbon of the second cartridge may be moved into position behind the ribbon of the first cartridge so that printing is accomplished by the second cartridge. In still another modified form, the two cartridges are not on a common transport but are selectively movable into operating position and when either is moved into operating position the other is moved out of such position.

**20 Claims, 14 Drawing Figures**

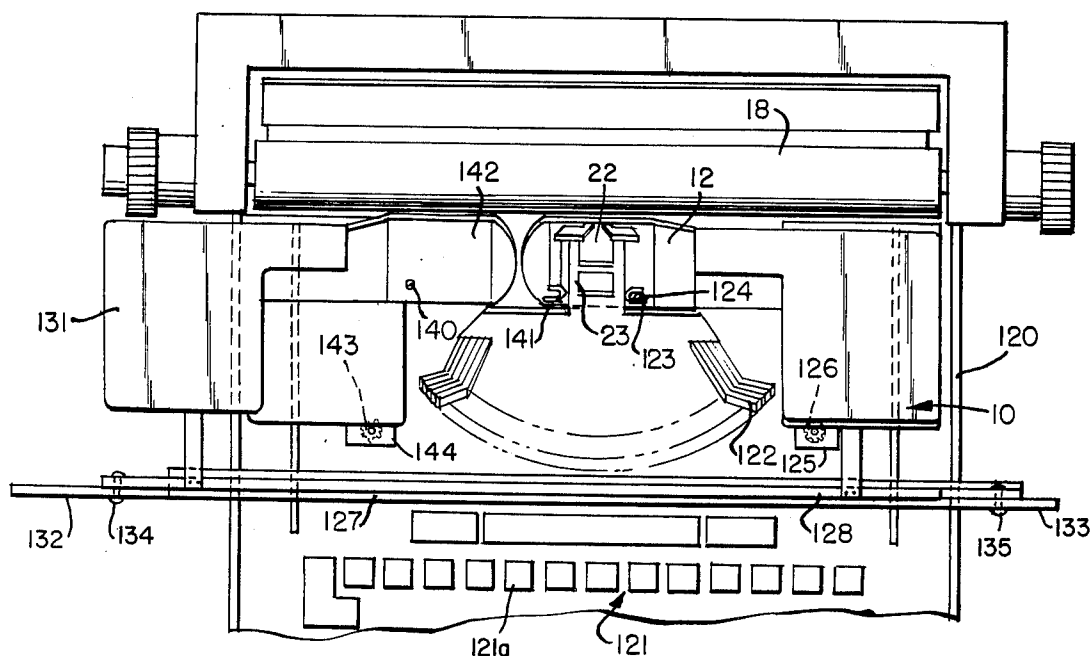


**FIG. 1.**

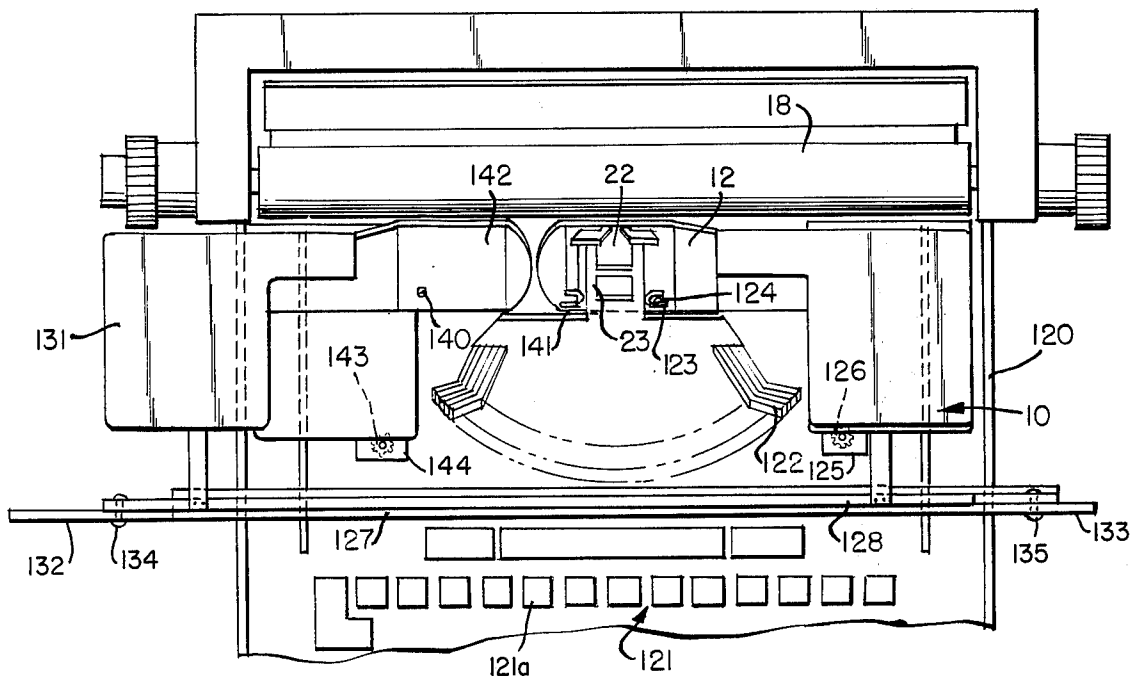
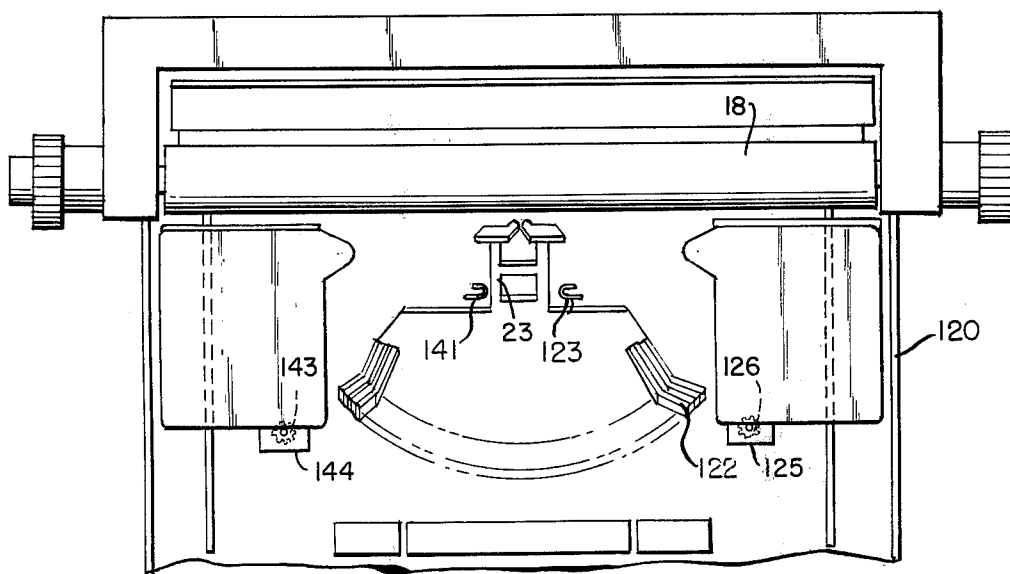


**FIG. 2.**

**FIG. 3.**

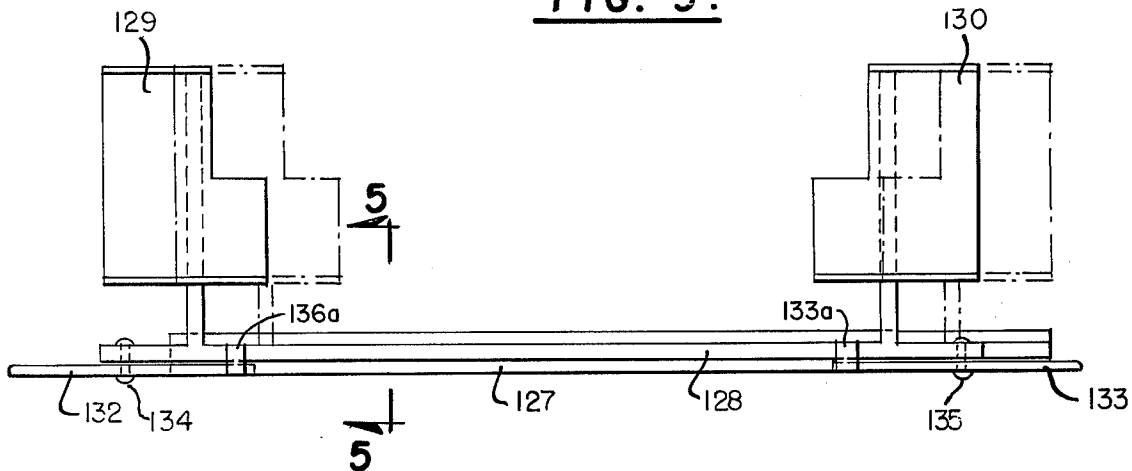


**FIG. 4.**

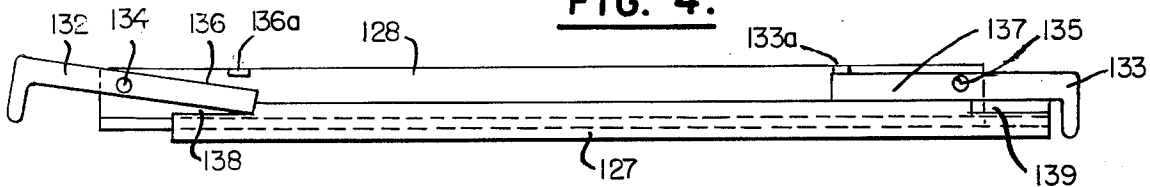


**FIG. 5.**

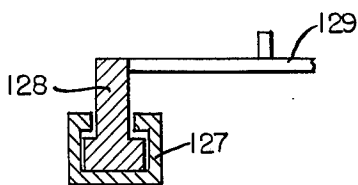


**FIG. 8.**

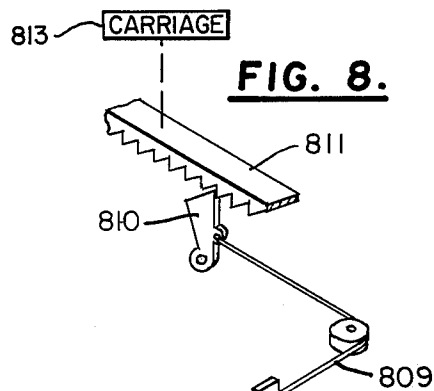


**FIG. 11.**

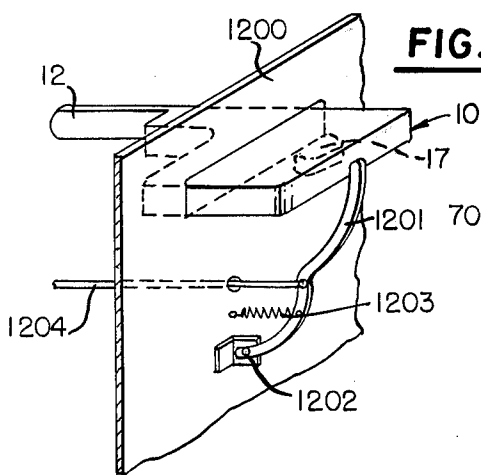
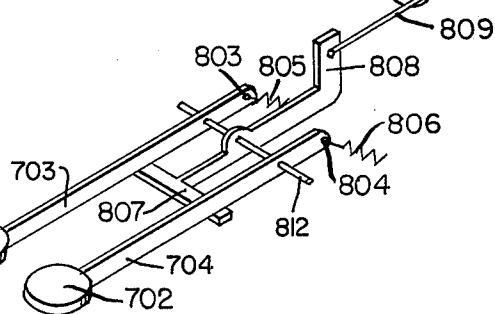


**FIG. 6.**

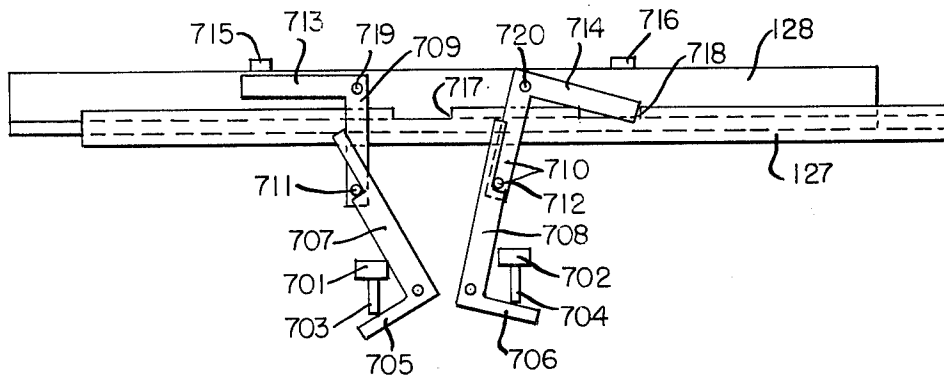


**FIG. 7.**

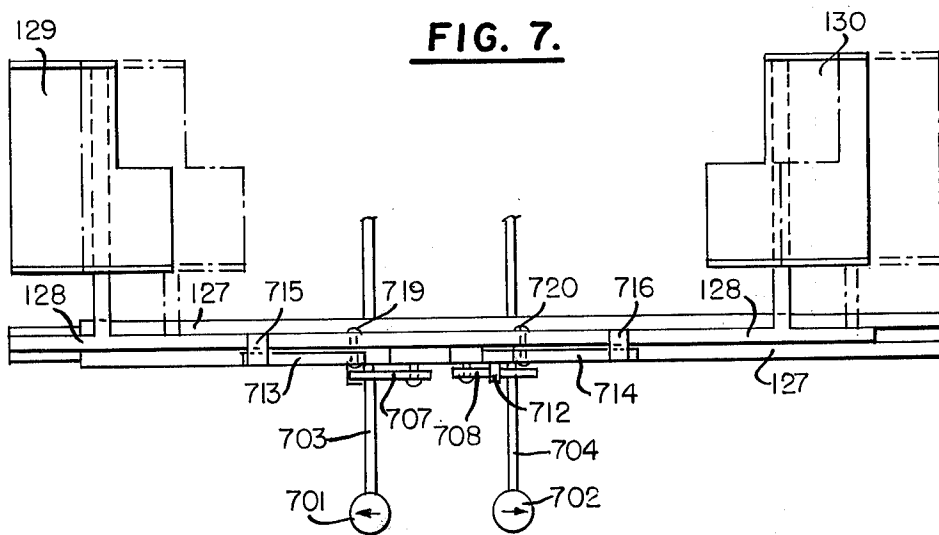


**FIG. 9.**

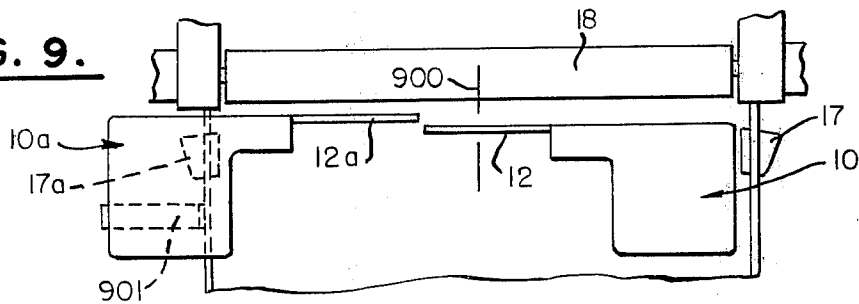


**FIG. 10.**

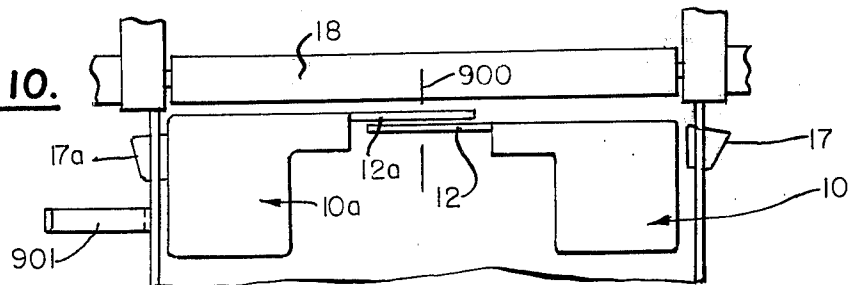


**FIG. 12.**

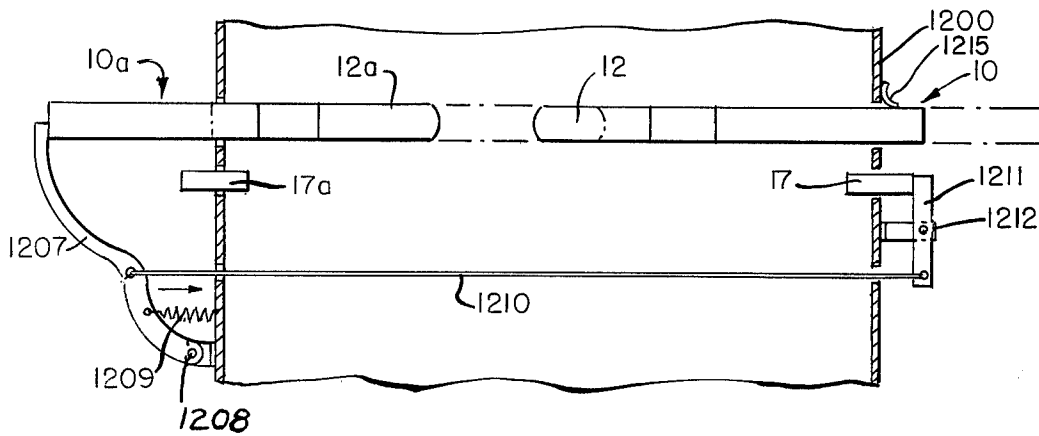
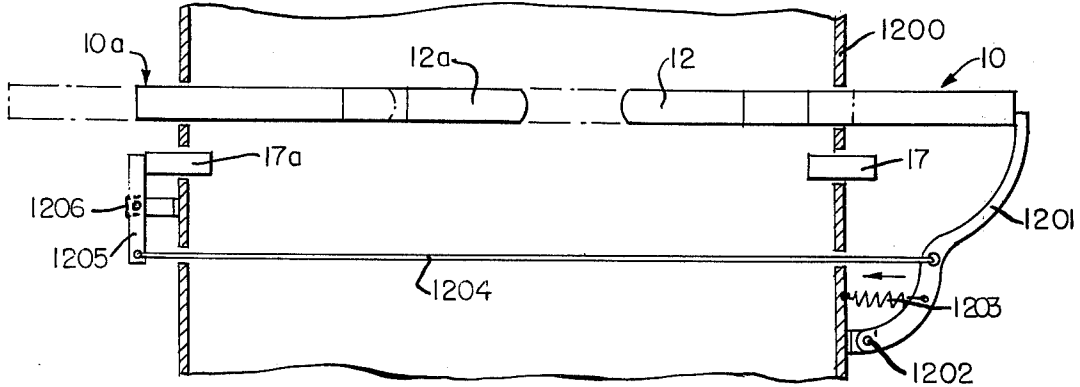
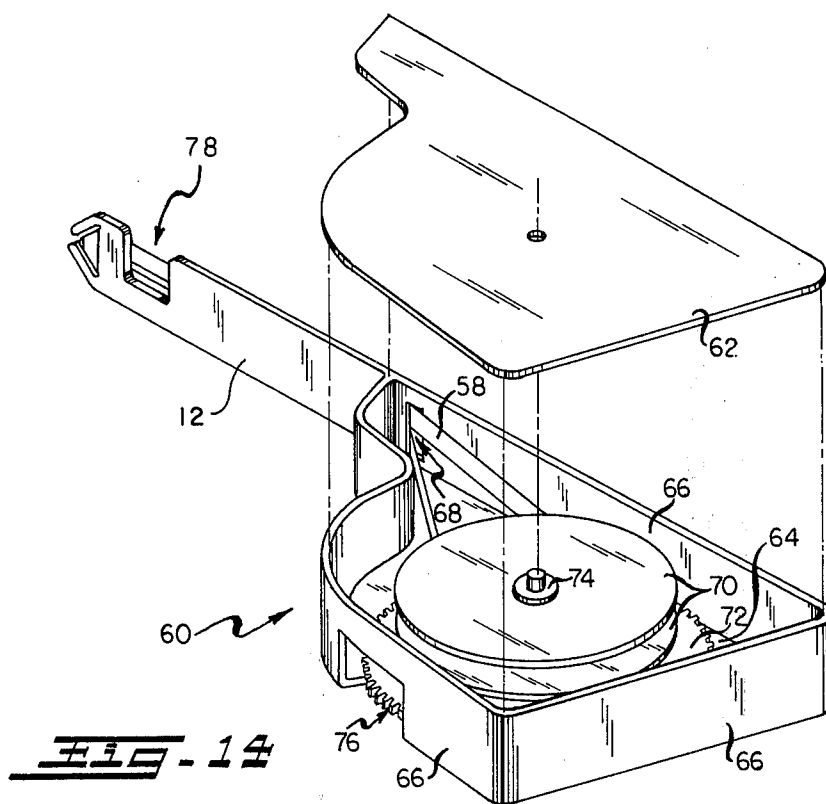


**FIG. 13.**





# PRINTING MACHINE IN WHICH THE RIBBONS IN TWO DIFFERENT CARTRIDGES MAY BE SELECTIVELY USED

## BACKGROUND OF THE INVENTION

Typewriters using two different ribbons, either of which may be readily selected by the typist, are very old. Further, the idea of locating the ribbon in a cartridge is also old and has the great advantage over more conventional machines that the typist may very easily replace an old ribbon when it wears out with a new one. However, with the present state of the art, if the cartridge idea is used, the switching from one to another color of ribbon is relatively slow.

Hence, the object of this invention is to provide a low cost, practical arrangement permitting two different cartridges to be alternately moved into operating position, quickly and easily.

## SUMMARY OF THE INVENTION

In one form of the invention two sockets are located at opposite ends of a transport. These sockets respectively receive two cartridges respectively containing two different ribbons. The transport may be moved by levers into two different positions in which the two ribbons are respectively in their operating positions. The apparatus includes means for locking the transport in each operating position and unlocking it before it is moved to the other operating position.

In the preferred form of the invention, two backspace keys respectively move the transport means to the two different operating positions.

There are two other forms of the invention, both characterized by the fact that there is no transport. In one of these forms, one cartridge normally remains in its operating position and, when it is desired to use the ribbon in the second cartridge, the latter is moved into its operating position which projects its ribbon between the ribbon of the first cartridge and the object to be printed. In another form of the invention the two cartridges are respectively movable into operating position, and there is a mechanism provided which causes the unwanted cartridge to abruptly jump out of operating position as the other cartridge is moved into operating position.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of a typewriter embodying the invention.

FIG. 2 is a plan view, the same as FIG. 1, but with the transport omitted.

FIG. 3 is a plan view of the transport mechanism of FIG. 1.

FIG. 4 is a front view of the transport mechanism of FIG. 1.

FIG. 5 is a detail view taken along line 5—5 of FIG. 3.

FIG. 6 is a front view of a modified form of transport mechanism.

FIG. 7 is a top view of the modified form of FIG. 6.

FIG. 8 is a perspective view of the keys and backspace means associated with FIGS. 6 and 7.

FIG. 9 is a top view of a modified form of the invention with the second cartridge out of operating position.

FIG. 10 is a top view of the form of invention shown in FIG. 9 but with the second cartridge in operating position.

FIG. 11 is a perspective view of a portion of the modified form of the invention shown in FIGS. 12 and 13.

FIG. 12 is a front sectional view of a modified form of the invention in which the right-hand cartridge is in operating position.

FIG. 13 is the same as FIG. 12 except that the left-hand cartridge is in operating position.

FIG. 14 is a partially exploded view of a cartridge that may be used in any of the several forms of my invention.

## DETAILED DESCRIPTION OF THE DRAWING

This invention may utilize ribbon cartridges of the type described in U.S. Pat. No. 3,643,777 dated Feb. 22, 1972, and issued to Carl P. Anderson et al. Since that patent will be referred to from time to time hereinafter, it is to be understood that any use of a reference number up to and including 118 is a reference to a part in the Anderson et al. U.S. Pat. No. 3,643,777, and reference numbers 120 and higher refer to parts of my apparatus not identified by reference numbers in the Anderson et al. patent. Where my drawing illustrate a part corresponding to one shown in Anderson et al. drawing, I use the reference number adopted by Anderson et al. to identify that part. Since the details of the cartridge do not constitute my invention, either embodiment of Anderson et al. cartridge, or indeed any other suitable cartridge, may be used in my invention.

FIG. 14 is a reproduction of FIG. 3 of said Anderson et al. patent and therefore illustrates one form of cartridge that may be used with the apparatus of FIG. 1.

Referring now to FIG. 14, a housing embodiment is shown to accommodate a double ribbon spool system for supporting a conventional ribbon 58. The housing 60 has top and bottom covers 62 and 64 respectively and a perimatic wall 66 with a ribbon egress-ingress opening 68. The supply spool 70 and the takeup spool 72 are coaxially and pivotally mounted on a hub 74 which is rigidly mounted between the top and bottom covers 62 and 64 respectively. The lower or takeup spool 72 is provided with teeth 76 on the periphery of its lower flange for mating with a suitable drive gear, such as gear 126 of FIG. 1, when the cartridge is in writing position.

The upper and lower spools 70 and 72 respectively are pivotal with respect to each other and ribbon 58 is guided from the housing 60 to the print point 78 near the terminal end of the arm 12.

It will be evident that the drive gear 126 may incrementally rotate clockwise in response to typing actions, will effect a like counterclockwise rotation of the takeup spool 72 and the ribbon 58 will in turn by incrementally fed from right to left behind the arm opening 78 and past the print point 22 of the typewriter.

My new typewriter has the usual frame 120, platen roller 18, keyboard 121, and type bars 122 (see FIG. 1). The type guide 23 is of the usual type. The arm portion 12 of the cartridge 10 carries the typewriter ribbon 58 past the writing location above guide 23. This arm 12 is pivoted to the cartridge 10 so that it may be rotated to raise the ribbon to writing position above guide 23. This is accomplished by a U-shaped element 123, extending to the right of guide 23 but not connected thereto, and which is raised whenever a writing

key such as key 21a on the keyboard 121 is depressed. The arm portion 12 has a horizontal pin 124 extending therefrom which passes into the slot of the U-shaped element 123 and thus moves upward and carries the pivoted arm portion 12 upward,, whenever a key is depressed. Thus, the operation usually carried out by a ribbon vibrator is accomplished.

The typewriter as shown in FIG. 2 has gear 126 disposed to be engaged by gear 76 (see FIG. 14) extending from cartridge 10, to drive the ribbon, all in the same manner as is contemplated by, but not described in, said Anderson et al. patent.

The frame 120 includes support portions 125 and 144 for gears 126 and 143 respectively.

Located above, and further backwards than, the keyboard 121, is the following new apparatus: In FIG. 3, stationary support 127 is secured to typewriter frame 120, and provides a track for transport 128 which carries two sockets 129 and 130. Socket 130 receives the cartridge 10 together with its arm 12 as shown in FIG. 1. Socket 129 receives cartridge 131 which is identical to cartridge 10 except it is adapted to move into position from left to right, rather than vice versa. The transport 128 carries pivots 134 and 135 which respectively support handles 132 and 133. In FIG. 4, arms 136 and 137 extend away from handles 132 and 133 respectively and are adapted to respectively engage the end walls of the cut-outs 138 and 139 in the stationary support 127.

Thus, when the apparatus is in the position shown in FIGS. 1, 3 and 4, the right hand cartridge 10 is in operating position and its ribbon is in "writing" location. By "writing" location (referred to in some claims as "given location"), I refer to the position or location of the ribbon before a writing key is depressed to operate the ribbon vibrator to raise the ribbon to the position it assumes when actual printing occurs. If now the operator wishes to use the ribbon in cartridge 131, he merely presses handle 132 to rotate it counterclockwise until arm 136 strikes pin 136a. This unlocks the transport 128 since arm 136 moves out of the cut-out 138. The handle 132 may then be moved to the right until the forward portion 137 of handle 133 drops into cut-out 139 and locks the transport 128. In this position the transport 128 cannot move further to the right since the handle 132 is in engagement with stationary support 127 and cannot move to the left since the forward part 137 of handle 133 is in engagement with the end wall of cut-out 139. In this locked position, the cartridge 131, which is carried in socket 129, has moved its ribbon carrying arm 142 into writing location and its horizontal pin 140 has moved into the U-shaped slot of vibrator 141. Thus, whenever a key, such as key 121a, of the keyboard 121 is depressed, the vibrator 141 moves upward, carrying the pin 140 and the pivoted ribbon carrying arm 142 upward, so that the ribbon is in writing location.

The new typewriter has gear 143 which performs the same function with respect to cartridge 131 as was described with respect to gear 126 and cartridge 10.

If next the operator wishes to use the ribbon in cartridge 10, he simply presses handle 133, to rotate it clockwise until arm 137 strikes pin 133a to unlock the transport 128 and move it to the locked position shown in FIGS. 1, 2 and 4.

The gears 126, and 143 project from parts of the typewriter that are secured to the frame 120. They are entirely separate from transport 128 and sockets 129

and 130. However, whenever either of cartridges 10 or 131 is carried by its socket 130 or 129 (as the case may be) into operating position, the appropriate gear 126 or 143 (as the case may be) engage the complementary gears gear 76 on the cartridge 10 or 131 to thereby provide for the driving of the ribbon spools 70 and 72 in the cartridge 10 or 131 (as the case may be).

In the modified form of the invention, as shown in FIGS. 6, 7 and 8, two backspace keys 701 and 702 replace handles 132 and 133 for moving the transport 128 back and forth. The keys 701 and 702 have arms 703 and 704 respectively that bear upon the lower ends of pivoted arms 705 and 706 respectively, which arms 705 and 706 have upward portions 707 and 708 respectively which portions 707 and 708 are indented for a limited distance extending downward from their upper ends. These indented portions engage pins 711 and 712 on arms 709 and 710 respectively, which arms 709 and 710 are pivoted at 719 and 720 respectively. The arms 709 and 710 have generally horizontal portions 713 and 714 respectively, which have their upward motion limited by stop arms 715 and 716 respectively, which stop arms 715 and 716 are both supported by transport 128. The stationary support 127 has two indents 717 and 718 into which arms 713 and 714 may respectively fall to lock the transport 128. Sockets 129 and 130 are adapted to receive ribbon cartridges 131 and 10 respectively as in FIG. 1.

In the position of the apparatus shown in FIGS. 6 and 7, the right hand cartridge socket 130 is in such a position that any cartridge placed therein is positioned ready for use. If now the typist desires to shift the left-hand socket 129 into operating position, the key 702 is depressed. This rotates arm 708 clockwise causing it to engage pin 712 moving the latter to the right and thus rotating crank 710, 714, counterclockwise. This unlocks the transport 128 by moving arm 714 out of indent 718, and as arm 714 rotates further it engages stop 716. As the key 702 is depressed further the crank 710, 714 moves further to the right carrying its pivot 720 and the transport 128, to which the pivot 720 is attached, with it until the left hand socket 129 is moved into operating position at which time arm 713 falls into indent 717 and locks the transport 128.

If next the typist wishes to move the right-hand socket 129 into operating position, the key 701 is depressed rotating arm 707 counterclockwise, moving pin 711 to the left, rotating crank 709, 713 clockwise until arm 713 is restrained by stop-arm 715. In the meanwhile, the transport 128 is unlocked when arm 713 moves out of indent 717. The transport 128 then moves to the left, as the key 701 is further depressed, until the transport 128 moves the right-hand socket 130 into operating position and arm 714 falls into indent 718 to lock the transport 128.

In the preferred form, keys 701 and 702 are backspace keys as shown in FIG. 8, although within the broader aspects of this invention they need not operate a backspace mechanism in addition to operating the transport 128. In FIG. 8, the keys 701 and 702 (respectively pivoted at 803 and 804 and held in normal position by springs 805 and 806 respectively) operate all of the mechanism of FIGS. 6 and 7 and in addition the depression of either key 701 or 702 rotates bar 807 about its pivot 812 thus causing arm 808 to pull wire 809 causing pawl 810 to move rack 811 to thus move the carriage 813 backward one space.

FIGS. 9 and 10 show a further modified form of the invention in which the typewriter, the cartridge 10 with its ribbon arm 12, the platen roller 18 and the cartridge release lever 17 are identical to the corresponding parts of said Anderson et al. patent. Cartridge 10a with ribbon arm 12a and lever 17a are similar to parts 10, 12 and 17 respectively except that (1) they are reversed so as to move in from the left instead of from the right, and (2) the ribbon arm 12a, when it is moved into writing location (FIG. 10), is between ribbon 12 and platen roller 18. A stop in the form of a spring 901 is provided to limit the leftward movement of cartridge 10a to the position shown in FIG. 9. The type bars (such as 122 of FIG. 1) move along line 900.

In operation, the typist may type with one color of ribbon by using cartridge 10, as shown in FIG. 9. If next it is desired to use a ribbon of another color (in arm 12a) the left-hand cartridge 10a is moved to the right so that it is between ribbon arm 12 and platen roller 18. Thus, if a type bar (such as 122 of FIG. 1) now strikes the ribbon in arm 12 it presses that ribbon against the one in arm 12a and the latter ribbon performs the printing. If the typist wishes to type extensively with the ribbon in arm 12a, the cartridge 10 may be partly or wholly removed from the machine.

The cartridges 10 and 10a of FIGS. 9 and 10, as well as those about to be described in FIGS. 12 and 13, have suitable pins such as 124 and 140 (FIG. 1), and each form of the invention has suitable U-shaped elements 123 and 141 (see FIG. 1) operated by writing keys, for performing the function of a ribbon vibrator (raising the ribbon from its writing to its printing location when a key is depressed).

In the modified form of FIGS. 11, 12 and 13, the typewriter frame 1200 carries cartridge 10 having ribbon arm 12 and release lever 17 the same as in said Anderson et al. patent. Another cartridge 10a with ribbon arm 12a and release lever 17a is employed and is the same as the parts 10, 12 and 17 except adapted to be inserted into the left of the machine instead of the right. Unlike FIGS. 9 and 10, the ribbon arms 12 and 12a of FIGS. 12 and 13 are in alignment rather than arm 12a being behind arm 12. In FIG. 12 is shown a curved arm 1207 pivoted at 1208 and pulled to the right by spring 1209 so that arm 1207 remains in mild contact with cartridge 10a. Rod 1210 connects arm 1207 to arm 1211 which is pivoted to stationary arm 1212. The upper end of arm 1211 engages release lever 17. Normally, the spring force tending to rotate arm 1207 clockwise also tends to hold cartridge 10a in the machine. When it is desired to remove cartridge 10a from the machine it may be pulled to the left. Arm 1207 will then rotate counterclockwise to permit cartridge 10a to be removed.

In FIG. 13, the curved arm 1201 is pivoted at 1202 and is pulled to the left to mildly engage cartridge 10 by spring 1203. Rod 1204 connects arm 1201 to lever 1205, which is pivoted to stationary post 1206. The upper end of lever 1205 engages lever 17a.

It is understood that a given typewriter according to the invention may include all of the parts shown in both FIGS. 12 and 13 on the same machine.

With the apparatus in the position shown in FIG. 12 the ribbon arm 12 is in writing position, and arm 12a is out of writing position. If now the typist wishes to use the ribbon in arm 12a, the human hand is brought into contact with the left-end of cartridge 10a and arm 1207 jointly, and both the cartridge 10a and the arm 1207

are moved to the right until cartridge 10a is in operating position. As such movement begins, arm 1211 rotates counterclockwise engaging lever 17 and pressing it in to release cartridge 10 from the detent mechanism 1215 that holds it in position. The various parts thereupon assume the position shown in FIG. 13. The cartridge 10a is now held in position for actual use. If next the typist wishes to use the ribbon in cartridge 10, the human hand engages cartridge 10 and arm 1201 and presses them toward the left thus pressing lever 17a inward, releasing cartridge 10a from the holding effect of its detent mechanism and permitting it to snap abruptly leftward so that arm 12 of cartridge 10 may move into operating position.

In the case of each form of the invention, any two ribbons may be used in the two cartridges. Normally the two ribbons would be different in color, for example, the ribbon in cartridge 10a may be white correcting material while the ribbon in cartridge 10 may be a conventional black ribbon.

It is also understood that in each one of the various forms of the invention the ribbon-arms 12 and 12a when moved to writing position are located below the actual printing location and that when a writing key is depressed the U-shaped elements 123 and 141 are raised to thereby raise pin 124 (and/or 140 as the case may be) and carry the pivoted arm 12 (and/or 12a) into printing position, all as shown in connection with the first form of the invention.

I claim to have invented:

1. In a printing machine adapted to receive an object to be printed, first and second separate printing mediums, first and second cartridge elements respectively supporting, mutually exclusively one from the other, said first and second separate printing mediums, a printing device operable to perform a printing operation by causing at least a portion of a printing medium to be moved from a given location and to contact the object to be printed, means for retaining a first and second socket means in spaced relation to each other, said first socket means carrying said first cartridge element to position its printing medium at said given location, and said second socket means carrying said second cartridge element and operable to move said second cartridge element to enable the printing medium of said second cartridge element to be moved to said given location and means operable such that when said second cartridge element is so moved the said first cartridge element is moved to move its printing medium away from said given location.

2. A printing machine as defined in claim 1 in which said first and second printing mediums are first and second ribbons respectively.

3. A printing machine as defined in claim 2 in which the second cartridge element includes means that advances the printing ribbon of the second cartridge element in response to each printing operation performed with that ribbon.

4. A printing machine as defined in claim 2 wherein said first and second cartridge elements include means for advancing its ribbon whenever such ribbon is involved in a printing operation.

5. A printing machine as defined in claim 4 in which said means for retaining said socket means includes a single movable transport movable to first and second positions in which the first and second ribbons are respectively at said given location.

7

6. A printing machine as defined in claim 5 including locking means for locking said transport in one of said positions.

7. A printing machine as defined in claim 6 including means which, when a force is applied thereto, unlocks the transport and moves said transport from said one to the other of said positions.

8. A printing machine as defined in claim 5 including a keyboard with keys, and

means operated by one of said keys for moving the transport from one of said positions to the other.

9. A printing machine as defined in claim 8 including locking means for locking the transport in said one position and unlocking the transport upon the depression of said one key.

10. A printing machine as defined in claim 8, having a movable roller for carrying the object to be printed past said given location, and backspace means operated by said one key.

11. A printing machine as defined in claim 5 having a movable roller for carrying the object to be printed past said given location,

a keyboard having a plurality of keys,

backspace means operated by the depression of either of two of said plurality of keys for backspacing said roller,

locking means for locking said transport in said first position when said transport is moved into said first position and for locking said transport in said second position when said transport is moved into said second position, and

means operated by one of said two keys when the transport is in said first position for unlocking the transport and moving said transport to said second position and operated by the other of said two keys when the transport is in said second position for unlocking the transport and moving said transport to said first position.

12. In a printing machine,

an elongated roller for carrying the object to be printed,

keys and printing elements actuated by the keys for performing printing operations,

first and second sockets respectively located adjacent opposite ends of the roller,

first and second cartridges respectively insertable into said first and second sockets,

each socket including means enabling a cartridge to be moved in a direction generally parallel to the roller from a position outside the machine into the socket,

each cartridge including a ribbon that may be positioned by the cartridge in a given location adjacent the roller and about midway between the ends of the roller,

and key-operated means for moving either ribbon that is in said given location into printing position.

8

13. A printing machine as defined in claim 12 having means operable, when either cartridge is moved to position its ribbon at said given location, to move the other cartridge so that its ribbon moves away from said given location.

14. In a printing machine,

keys and printing elements actuated by the keys,

a first cartridge containing a ribbon, said machine having socket means for receiving said cartridge and positioned to enable the cartridge when in the socket means to position its ribbon in a given location,

a second cartridge containing a ribbon, said machine having socket means for receiving said second cartridge and positioning said second cartridge to enable its ribbon to move into said given location, and

means operated by said keys to move either ribbon from said given location to printing position.

15. A printing device as defined in claim 14 wherein the ribbon of said first cartridge moves out of said given location when the ribbon of said second cartridge moves into said given location.

16. A printing device as defined in claim 14 wherein the ribbon of said second cartridge comprises a correcting material for printing formed by the ribbon of said first cartridge and such that when the ribbon of said second cartridge is moved into said given location, it is located on the side of the ribbon of said first cartridge opposite the side adjacent the printing elements.

17. In a printing machine, first and second elements respectively supporting first and second separate printing mediums, a printing device including means for printing characters along parallel lines and for causing at least a portion of a printing medium to be moved from a given location to contact the object of be printed as part of each printing operation, and first means carrying said first element and movable along a path parallel to said lines to position its printing medium at said given location, and second means carrying said second element and operable to enable the printing medium of said second element to be moved along a path parallel to said lines to said given location, and means operative such that when said printing medium of said second element is so moved, the first element is moved to move its printing medium away from said given location.

18. A printing machine as defined in claim 17 in which said printing mediums are ribbons.

19. A printing machine as defined in claim 18 in which the second element includes means that advances the printing ribbon of the second element in response to each printing operation performed with that ribbon.

20. A printing machine as defined in claim 18 wherein each element includes means for advancing its ribbon whenever such ribbon is involved in a printing operation.

\* \* \* \* \*

60

65