United States Patent [19]

Kuramochi

[11] **3,763,988**

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[54] **CARTRIDGE RIBBON DRIVE MECHANISM**

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Related U.S. Application Data

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[52] **U.S. Cl.** **197/151**, 74/133

[51] **Int. Cl.** **B41j 33/14**

[58] **Field of Search** 197/151, 153, 160–165; 101/336

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Assistant Examiner—R. T. Rader
Attorney—Blum, Moscovitz, Friedman & Kaplan

[57] **ABSTRACT**

The operating characteristics of an inexpensive typewriter intended primarily for juvenile use are improved with respect to the ribbon drive and reversal of ribbon drive direction and with respect to the carriage escapement. A single lever positions two cams so that one reel is driven by key action and draws in ribbon while the other is free-running and feeds out ribbon. Shifting the lever, positions the cams to shift the drive from one reel to the other with reversed direction of rotation and thus changes the direction of ribbon travel.

2 Claims, 7 Drawing Figures

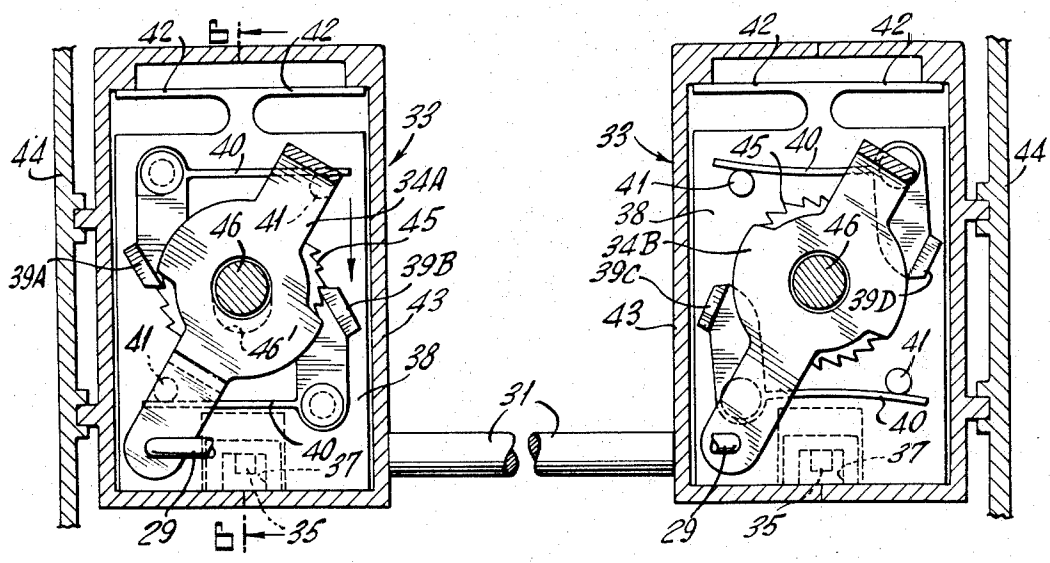
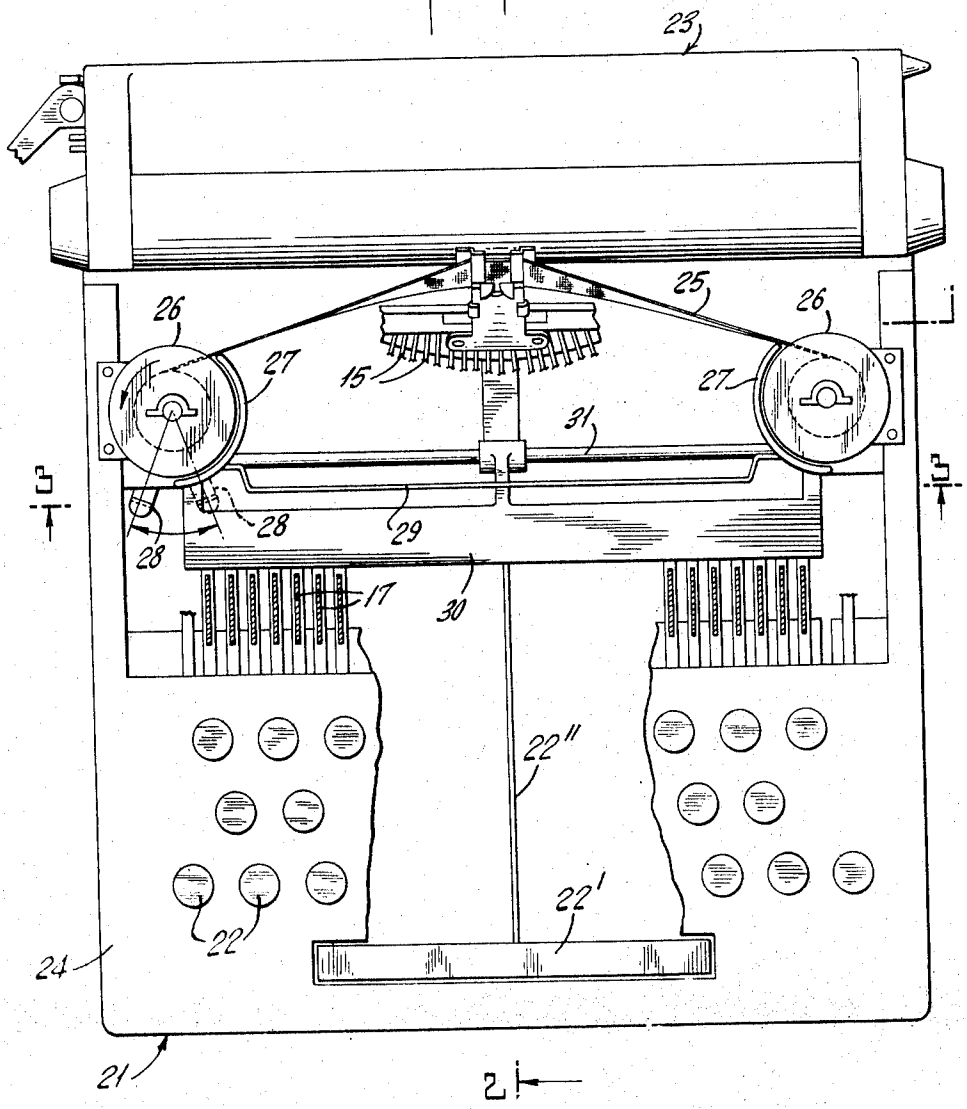
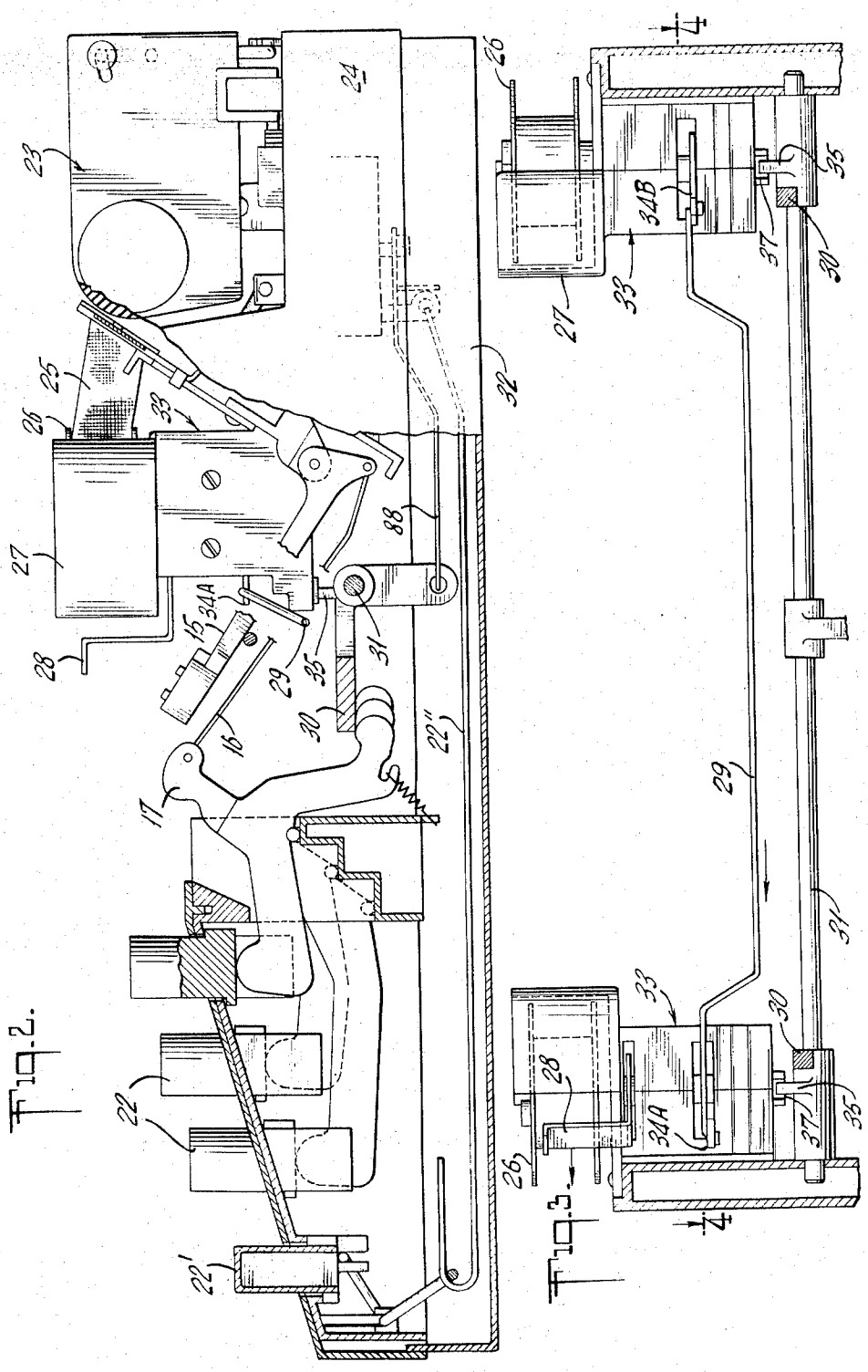


Fig. 1.

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34A
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22''
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22'
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FIG. 2.
FIG. 3.

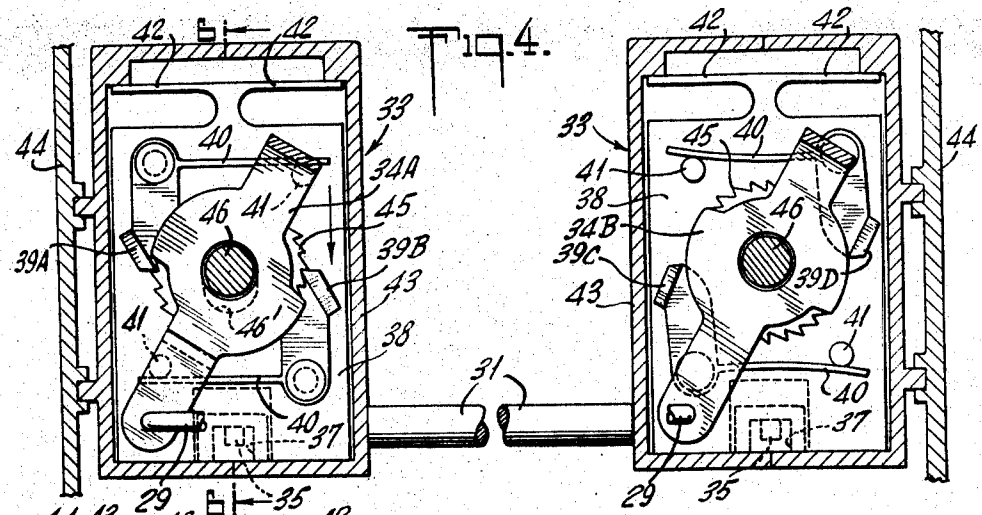

FIG. 4.

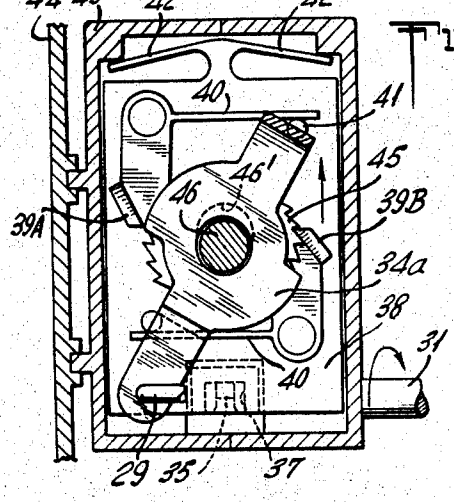

FIG. 5.

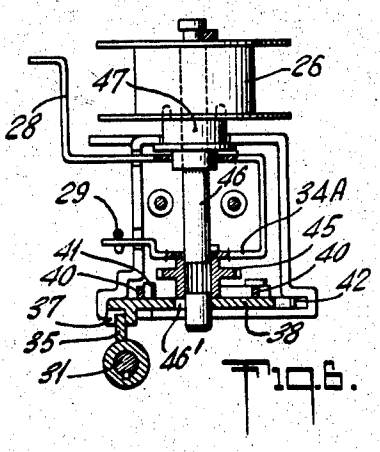

FIG. 6.

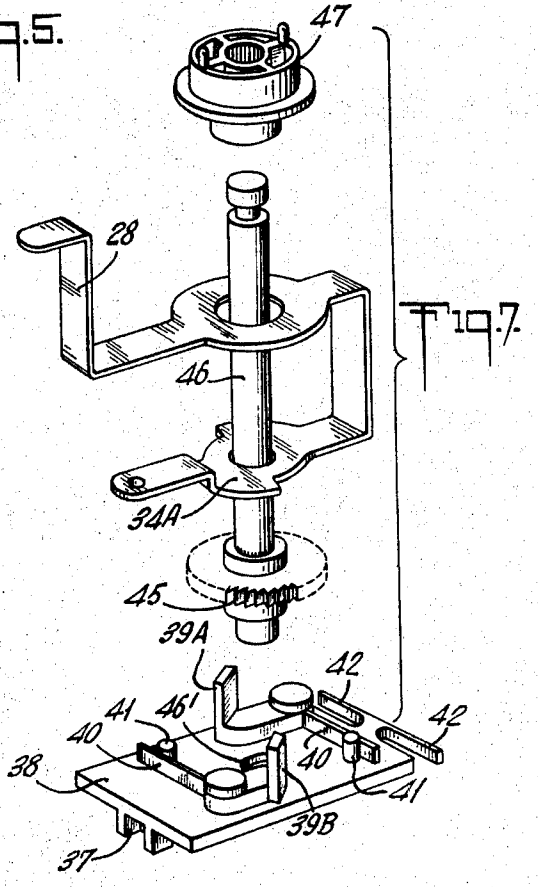

FIG. 7.

CARTRIDGE RIBBON DRIVE MECHANISM

This is a division, of application Ser. No. 141,861, filed May 10, 1971 now U.S. Pat. No. 3,724,632.

BACKGROUND OF THE INVENTION

Typewriters of various sorts intended for portable and juvenile use where the typewriters are simply and inexpensively fabricated have been marketed for some time. Such prior typewriters have generally made substantial sacrifices in performance for the sake of reduced cost and certain marketed machines have operated rather poorly particularly with respect to key touch or action.

SUMMARY OF THE INVENTION

Improved performance of a simply and inexpensively fabricated typewriter intended for portable and juvenile use has been provided by improvements in the transport mechanism of the ribbon; the direction of ribbon travel being reversible by movement of a single lever.

The ribbon transport mechanism is activated by depression and release of a key, thereby rotating a transverse shaft forward and backward. Pins at either end of the shaft, are each disposed to drive one of two ribbon reel assemblies in opposite directions by means of pawl and ratchet wheel arrangements. A pair of linked cams can be placed in either of two positions, in each of which only one of the ribbon reel assemblies is coupled to a pin on the shaft the other being free to rotate under pull of the ribbon, thus providing for drive of the ribbon in either direction. Economy of cost and space in the drive mechanism are effected by use of molded plastic components molded integrally with biasing fingers where needed.

Accordingly, an object of the invention is to provide a typewriter having improved action.

A further object of the invention is to provide an improved ribbon drive assembly capable of reversal.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWING

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawing, in which:

FIG. 1 is a plan view of the typewriter according to the present invention with the cover removed and part of the casing broken-away;

FIG. 2 is a partial sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a partial sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is a partial sectional view of the ribbon reel assemblies taken along 4—4 of FIG. 3;

FIG. 5 shows one of the ribbon reel assemblies of FIG. 4 with a support plate displaced from its rest position;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 4; and

FIG. 7 is an exploded perspective view of a ribbon reel assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A typewriter having a construction in accordance with the present invention is shown in FIGS. 1 and 2, where the typewriter in general is indicated by the reference number 21, having keys 22, a space bar 22', a space bar link 22'', a carriage 23, a plastic casing 24, a ribbon 25, ribbon reels 26, reel shields 27, a reversing lever 28, a reversing link 29 between the ribbon reels 26 and a universal bar 30, activated by all of the keys of the typewriter to rotate with a drive shaft 31. Type bars 15 are operated through links 16 and key levers 17 by the keys 22. The key levers 17 also operate universal bar 30.

Shown in FIG. 2 in a cross-sectional view is a base 32 of the typewriter, the reversing lever 28 by which the direction of travel of a ribbon 25 can be reversed, the drive shaft 31 and the universal bar 30.

Referring now to FIG. 3, encased ribbon reel assemblies can be seen at 33, and ends of cams 34A and 34B which control the direction of travel can be seen protruding from slots in the ribbon reel assemblies. Arms 35 near the ends of the drive shaft 31, are shown entering slots 37 to drive support plates 38 (FIG. 4). As can be seen in FIG. 4, the support plates 38 carry pawls 39A and 39B in the left hand ribbon reel assembly and 39C and 39D in the right hand ribbon reel assembly. The pawls 39 A, B, C and D are biased by means of pawl springs 40 which press against pawl spring stops 41, the pawl springs being integrally molded with the pawls, all being mounted on support plates 38. The support plates 38 are biased toward a rest position as shown in FIG. 4 by means of biasing fingers 42 which are integrally molded with the support plates. The biasing fingers 42 press against a casing 43 when the support plate 38 is displaced from rest position; the casing 43 is mounted in a frame member 44.

In the cam positions as shown in FIG. 4, the cam 34A permits the pawls 39A and 39B to engage a ratchet wheel 45. The cam 34B holds the pawls 39C and 39D away from the ratchet wheel 45 in the right hand reel assembly. As a result the right hand ratchet wheel 45 and a shaft 46 centered within it can rotate freely under the urging of the ribbon reel mounted above as the reel is drawn by the ribbon being pulled toward the left hand reel assembly.

Rotation of the drive shaft 31 as shown in FIGS. 5 and 6 causes the arm 35 in the slot 37 to displace the support plates 38 in the direction shown by the straight, vertical arrow (FIG. 5). This motion engages the pawl 39B with the ratchet 45 to rotate it in the direction shown by the curved arrow. When the typewriter key causing this action is released, the drive shaft 31 rotates back to its rest position carrying the arm 35 with it and the pawl 39A engages the ratchet 45 to complete the rotation of the ratchet wheel through a distance corresponding to one pitch. It should be noted that pawls 39C and 39D are placed in the opposite sense with respect to the right hand ratchet wheel 45 and the ratchet wheel teeth similarly are oriented in the opposite direction to those of the wheel of the left hand assembly so that when the cam 34B permits the pawls in the right hand assembly to engage the ratchet wheel, the direc-

tion of rotation is opposite to that when the left hand ratchet wheel is driven.

As best seen in FIG. 6, the support plates 38 have a slotted opening 46' for passage of the shaft 46 therethrough and for permitting motion of the support plate 38.

The spacial relationships of the components of the ribbon reel assembly are shown in the exploded perspective view, FIG. 7. This view shows the reversing lever 28 joined to the cam 34A and makes clear how the pawls 39A and 39B are pivoted on the support plate 38. Also shown is the ribbon reel support 47.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a typewriter, a ribbon-drive mechanism comprising first and second reel assemblies, first and second movable support plates in said reel assemblies, said support plates being biased toward rest positions by first integrading molded fingers, drive means connecting said support plates to the keys of said typewriter so that depression and release of a key moves said support plates away from and returns said support plates to said rest position, a ratchet wheel rotatably mounted in each of said assemblies, two pawls pivotally mounted on each of said support plates, said pawls being engageable with and biased toward said ratchet wheels by second integrally molded fingers, a cam in each of said assemblies and engageable with said pawls, said cams in a first position permitting said pawls in said first assembly to engage said ratchet wheel in said first assembly, while holding said pawls in said second assembly disengaged from said ratchet wheel in said second assembly, thereby permitting said ratchet wheel in said second assembly to rotate freely, said cams in a second position permitting said pawls in said second assembly to engage said ratchet wheel in said second assembly while holding said pawls in said first assembly disengaged from said ratchet wheel in said first assembly, thereby permitting said ratchet wheel in said first assembly to rotate freely, each cycle of an alternate rearward and frontward motion of said support plates causing rotation of one of said ratchet wheels by said engaged pawls, said pawls being so mounted that said ratchet wheel in said first assembly rotates in one direction when driven by said pawls, and said ratchet wheel in said second assembly rotates in the other direction when driven by said pawls, a reversing link joining and positioning said cams so that engagement of said pawls in either of said assemblies disengages said pawls in the other of said assemblies, a reversing lever affixed to one of said cams, a shaft centered in each of said ratchet wheels, the shaft in the assembly wherein said pawls are engaged with said ratchet wheel being rotated by said ratchet wheel and a ribbon reel mounted on each of said shafts, each of said ribbon reels rotating conjointly with said shaft on which it is mounted.

2. The mechanism as defined in claim 1, wherein said drive means includes a universal bar rotatable with a dirve shaft from a rest position through an angle by depression of a key and returnable to said rest position by release of said key, an arm proximate each end of said universal bar, said arms each operatively engaging one of said support plates so that rotation of said universal bar away from rest position and return to rest position displaces said support plates away from and returns said support plates to rest position, the rotation of said universal bar about said drive shaft causing rotation of said ratchet wheels.

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