

[54] **RIBBON CASSETTES WITH
PRETHREADED VIBRATOR AND RIBBON
FEED MEANS**

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197/168; 197/170

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[58] **Field of Search** 197/151, 156, 162, 168,
197/170

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[57] **ABSTRACT**

Interchangeable ribbon cartridge constructions for housing, for facile mounting in a typewriter, an endless composite two color fabric ribbon, an endless fabric and an error correction ribbon, or a carbon ribbon and an error correction ribbon. The cartridges comprise left and right housings and front and back rigid connecting members extending between ribbon openings in the housings. The front connecting member includes prethreaded ribbon vibrator and guide means which automatically couples to ribbon elevating means when a selected cartridge is top loaded in the typewriter. The cartridges include pull type ribbon drive systems which freely track ribbon through the vibrator means from supply spools or supply compartments. Spent carbon and error correction ribbons are housed in storage compartments. Fabric ribbon is packed randomly accordin fashion in a supply compartment of one housing and freely tracks continuously through the other housing and the vibrator means. Cartridges accommodating an error correction ribbon and either a fabric or a carbon ribbon house the ribbons in vertically spaced compartments with the error correction ribbon moving opposite the inked ribbons when selected for operation.

10 Claims, 7 Drawing Figures

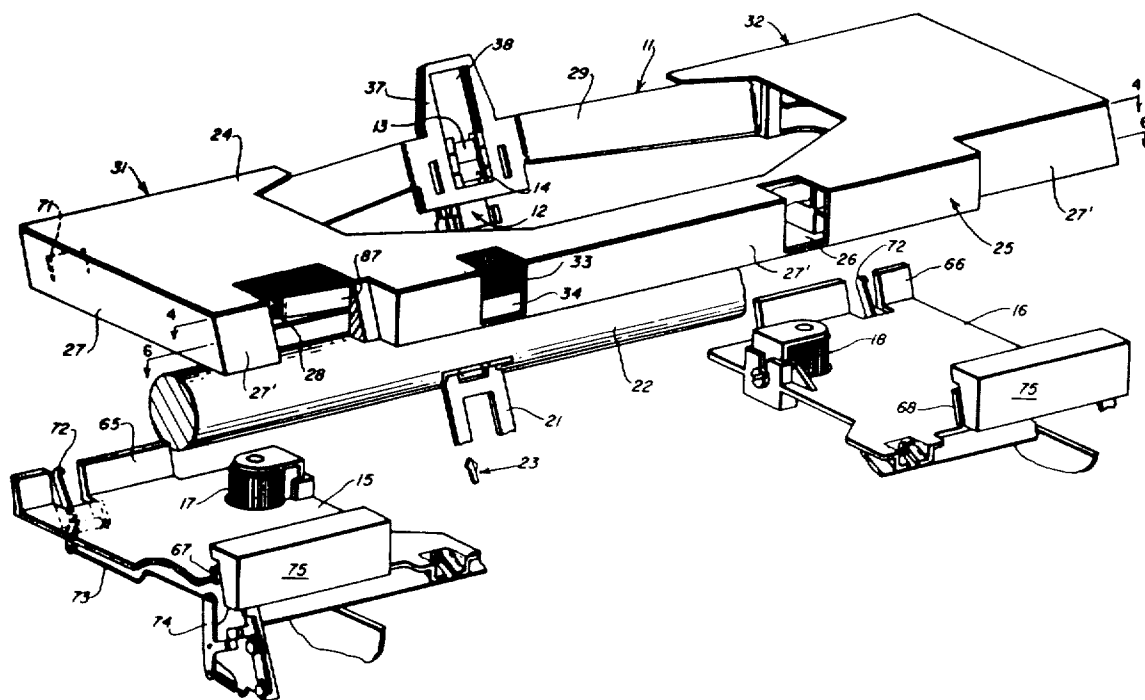
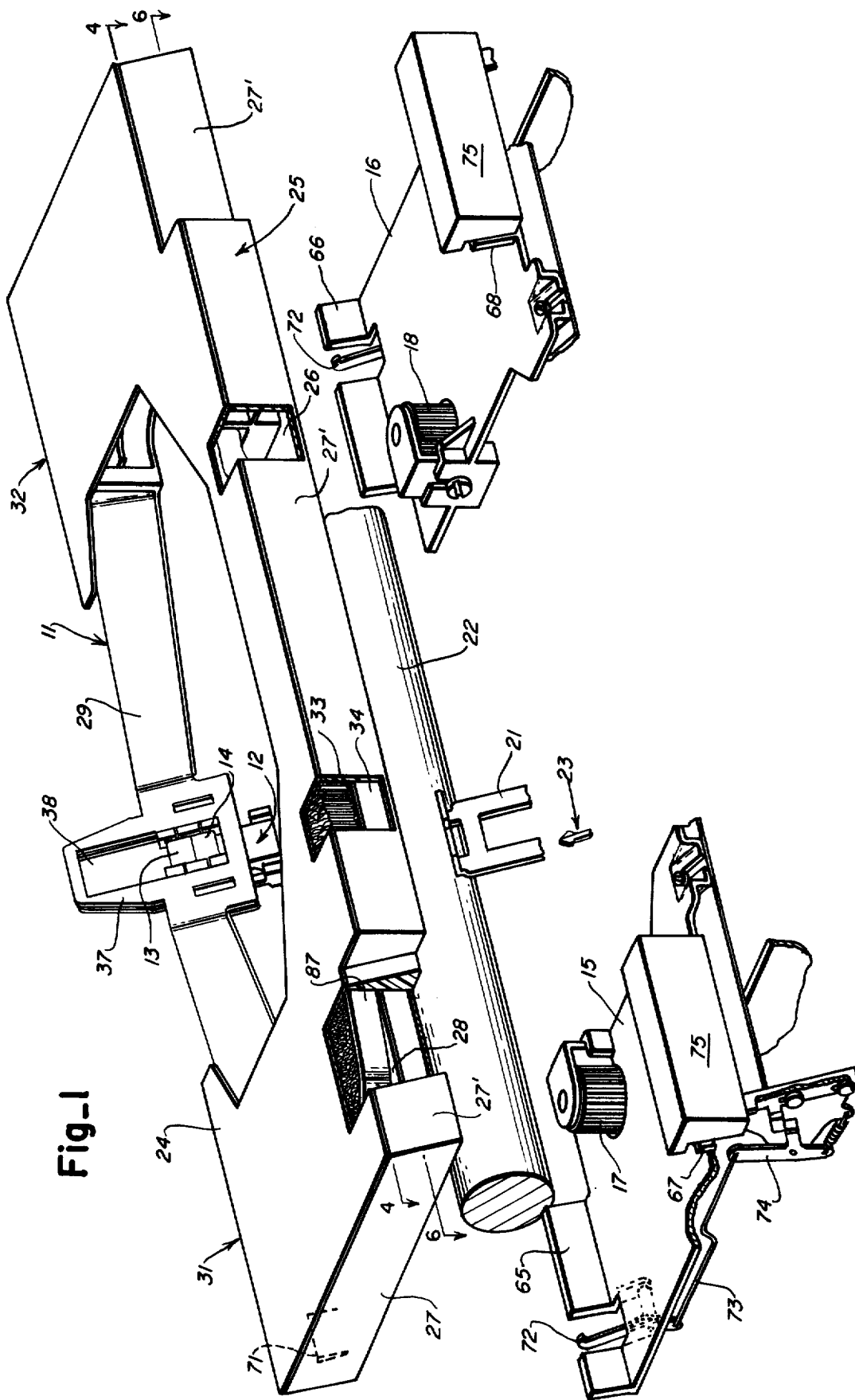


Fig. 1



SHEET 2 OF 5

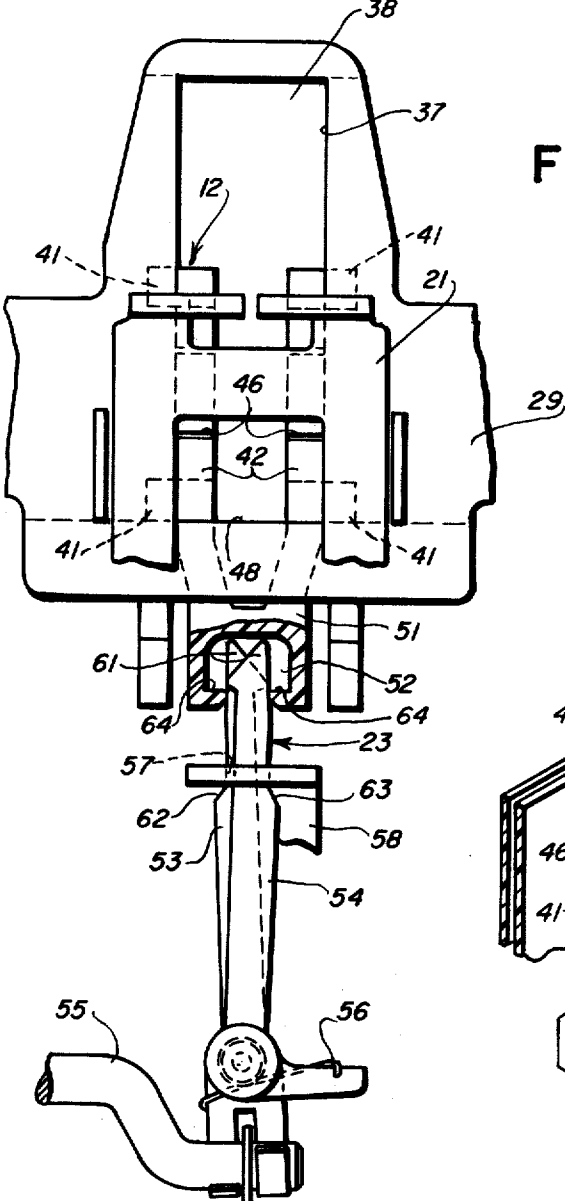


Fig. 3

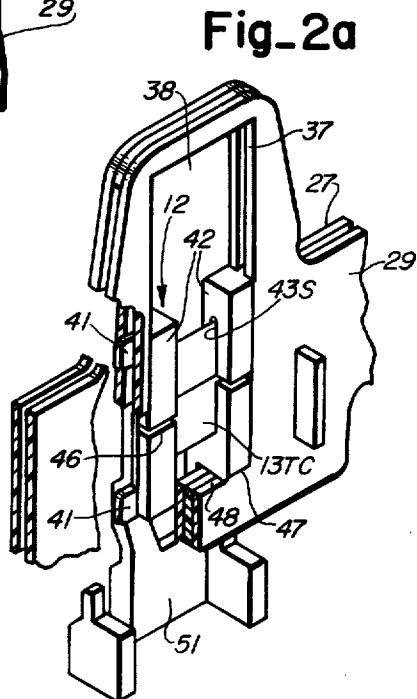


Fig. 2a

Fig. 2

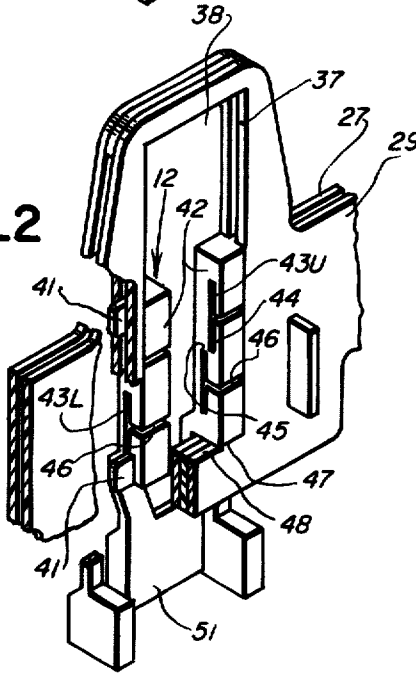


Fig-4

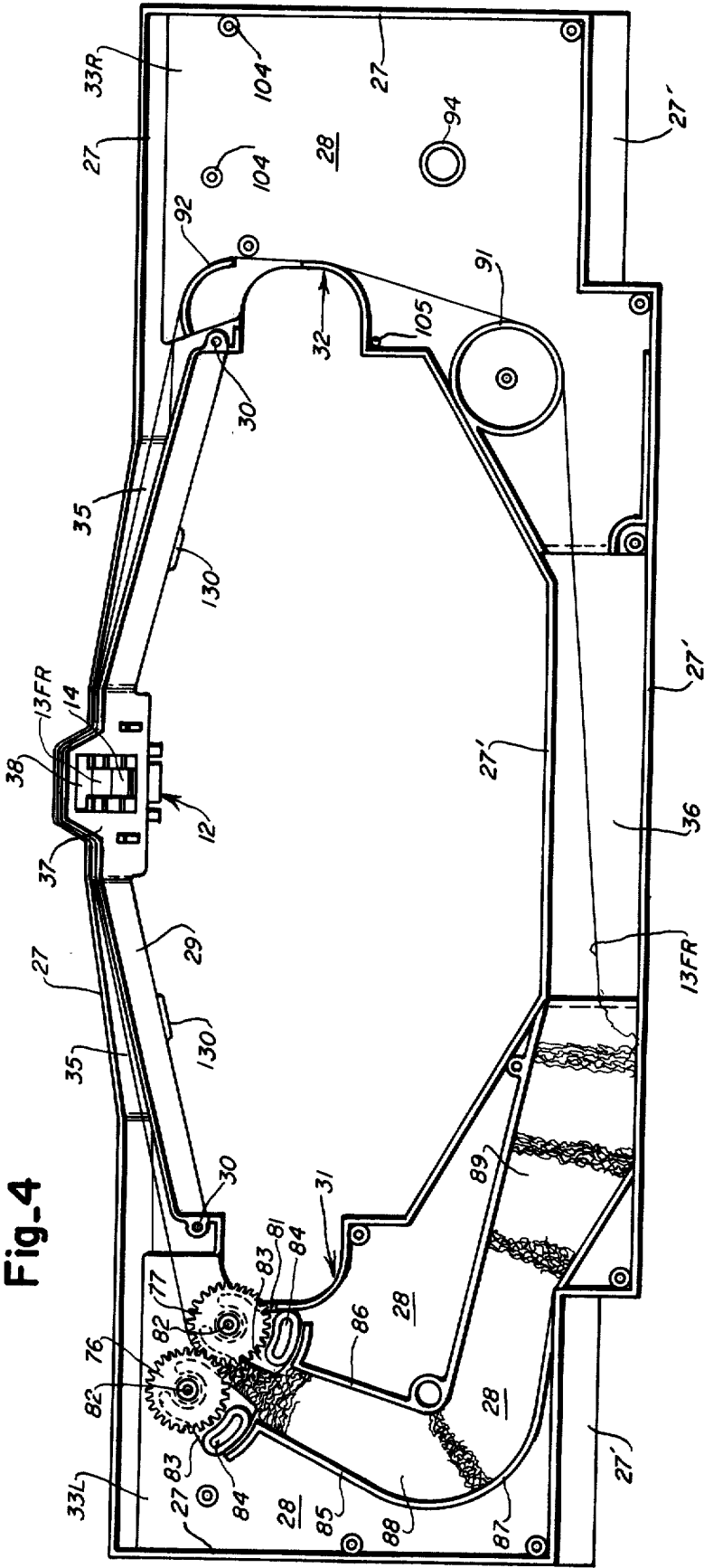


Fig. 5

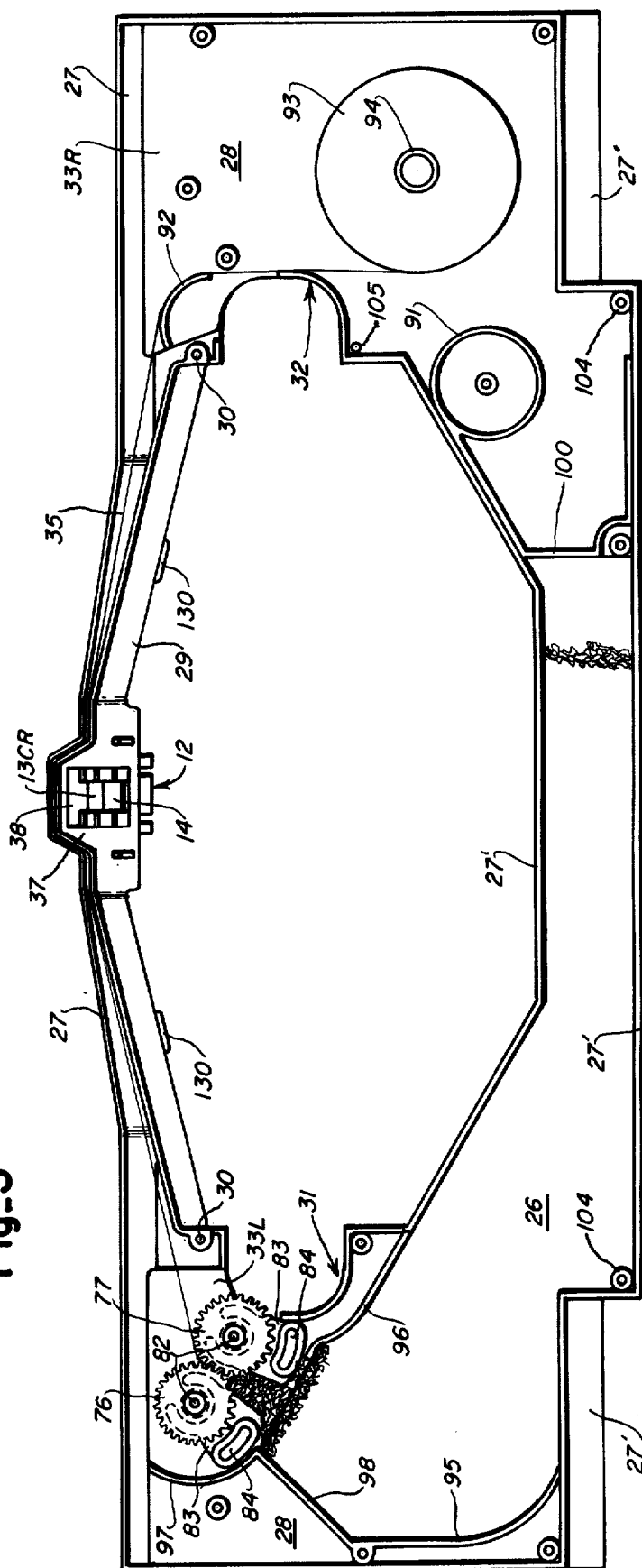
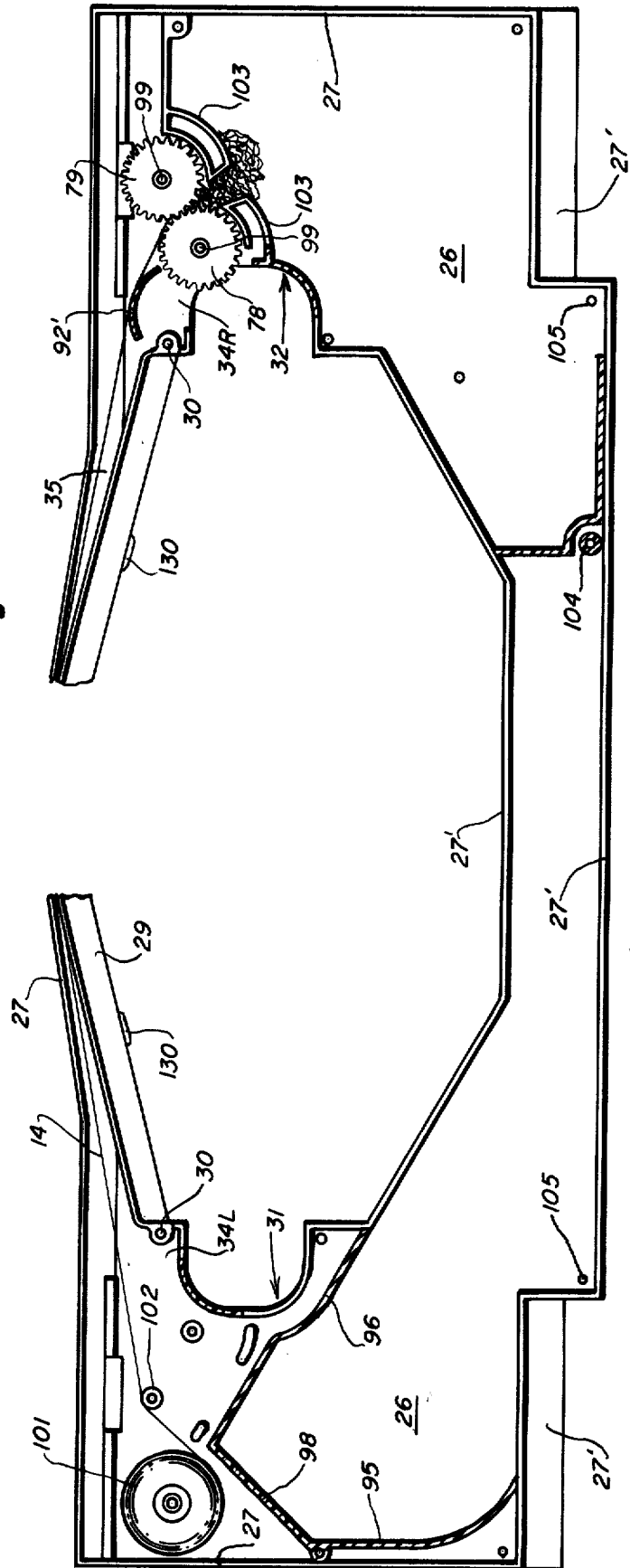


Fig. 6



RIBBON CASSETTES WITH PRETHREADED VIBRATOR AND RIBBON FEED MEANS

This invention relates to interchangeable ribbon supply cartridges accommodating either an endless composite two color fabric ribbon, a single color fabric ribbon and a one-time error correction ribbon, or a one-time carbon ribbon and a one-time error correction ribbon; more particularly, the invention relates to interchangeable ribbon supply cartridges including prethreated vibrator means to enable facile top loading of the cartridges; and specifically, the invention relates to interchangeable ribbon cartridges including a prethreated ribbon vibrator and including pull type ribbon drive systems to freely move ribbon past the printing point of a typewriter under proper tension.

In a typewriter or like business machine, it is a desirable objective to be able to change ribbons without having to manipulate ribbons or spool or spool housings to operatively mount them on the machine, to provide cartridges for facilitating loading of ribbons in a machine, and to easily interchange one type of ribbon or ribbons for another type depending on the type of work. Another desirable objective is to provide cartridges which contain both inked and error correction ribbons, the latter of which can be operatively brought into play to correct errors and otherwise to provide cartridges which contain adequate supplies of ribbon to reduce the frequency of ribbon changes.

An object of the invention is in the provision of ribbon cartridges which may be loaded in a typewriter and automatically connected with ribbon operating mechanisms of the typewriter.

Another object of the invention is to provide a ribbon supply cartridge which includes a prethreated ribbon vibrator that is automatically operatively couplable to ribbon elevating means when the cartridge is loaded in a typewriter.

Another object of the invention is to provide a ribbon cartridge having left and right housings joined by interconnecting members through which ribbon is guided and provided with pull type ribbon feed systems couplable to typewriter ribbon drive mechanisms to permit free tracking of ribbon.

Another object of the invention is in the provision of ribbon cartridges containing channels to control randomly folded endless ribbon to provide free tracking of ribbon.

A further object of the invention is in the provision of ribbon cartridges having vertically compartmented housings to accommodate inked and error correction ribbons which can be selectively engaged for operation.

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 drawing in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIG. 1 is a perspective view showing a cartridge in accordance with the invention provided with prethreated ribbon vibrator guide means and ribbon feed gears positioned for mounting on cartridge mounting platforms on the machine and couplable to ribbon drive gears on the machine and to ribbon elevating means on the machine;

FIG. 2 is a detailed perspective view of a ribbon-vibrator guide means associated with an inked and error correction ribbon cartridge;

FIG. 2a is a detailed perspective view of an additional embodiment of a ribbon-vibrator guide means wherein the ribbon-vibrator guide means is associated with a two color ribbon cartridge;

FIG. 3 is an elevational view showing the coupling between ribbon elevating means and the ribbon-vibrator guide means supported in the cartridge;

FIG. 4 is an elevational view of the cartridge taken along lines 4—4 of FIG. 1 with the top cover removed and showing a fabric ribbon supply in the upper compartment level of the left housing and the channel configuration for tracking the ribbon through the cartridges;

FIG. 5 is an elevational view similar to FIG. 4 showing a carbon ribbon supply spool in the upper compartment of the right housing and a used carbon ribbon storage compartment occupying both levels in the opposite housing; and

FIG. 6 is an elevational view taken along lines 6—6 of FIG. 1 showing the lower compartment levels of the left and right housings containing the error correction supply spool in the left housing and the error correction pull drive and used storage compartment in the opposite housing.

Referring now to the drawing with reference to FIG. 1, there is shown an assembled fabric ribbon-error correction ribbon containing cartridge generally designated by reference numeral 11 which supports a ribbon-vibrator guide means generally designated by reference numeral 12 through which an inked (fabric or carbon) ribbon 13 and an error correction ribbon 14 are prethreated. The cartridge 11 is adapted to be mounted on typewriter frame supported platforms 15, 16 to place feed gears 76, 77 (FIGS. 4 and 5) and 78, 79 (FIG. 6) within the cartridge 11 into meshing engagement with ribbon drive gears 17, 18 rotatably mounted on and extending through the platforms 15, 16 and to place the ribbon-vibrator guide means 12 between a type guide 21 and printing platen 22 and coupled to ribbon elevating means generally designated by reference numeral 23.

As shown in FIG. 1 and with reference also to FIG. 4, the cartridge 11 comprises a top cover 24, a bottom section generally designated by reference numeral 25 having a bottom wall 26 and upwardly directed side walls 27, and a section 28 intermediate the top cover 24 and bottom wall 26 which is supported in the bottom section 25. The assembly forms spaced left and right box-like housings generally designated by reference numerals 31 and 32 each having upper and lower compartments 33, 34 which are interconnected in spaced apart relationship by a front connecting wall 27 and spaced rear connecting walls 27'. Associated with the front connecting wall 27 of the bottom section 25 and parallel therewith is a wall 29 secured to bottom section 25 as at snap on points 130 (FIGS. 4, 5 and 6) and pins 30 (FIGS. 4, 5 and 6). The walls 27, 29 and 27' form front and rear passageways 35, 36 through which ribbon 13 in the upper compartment 33 and ribbon 14 in the lower compartment 34 pass respectively from left housing 31 to right housing 32 through the ribbon-vibrator guide means 12.

As shown in FIGS. 1 and 4, the connecting walls 27 and 29 forming the front passageway 35 are rearwardly

canted and in the central portion are substantially parallel and extend upwardly and downwardly to form a window like frame 37 around an opening 38 wherein is slidably supported the ribbon-vibrator guide means 12 through which ribbons 13 and 14 are threaded.

With reference to FIG. 2 and FIG. 2a, the ribbon-vibrator guide means 12 is slidably supported as by keys 41 extending laterally from the ribbon-vibrator guide means 12 between the parallel front wall 27 and rear wall 29 forming the front passageway 35 (FIG. 4). As viewed in FIGS. 2, 2a and 3, the ribbon-vibrator guide means 12 comprises an upwardly open fork whose vertical arms 42 contain ribbon 43U, 43L and 43S.

In those cartridges 11 which house inked fabric ribbon 13FR or carbon ribbon 13CR and error correction ribbon 14 as illustrated in FIG. 2, two discrete vertically spaced ribbon channels 43U and 43L will be formed in each of the fork arms 42 with the lower channels 43L offset slightly rearwardly of the upper channels 43U; and with the lower edge 44 of the upper channel 43U aligned with the upper edge 45 of the lower channel 43L. The upper channel 43U accommodates a 0.312 inch wide inked fabric 13FR or carbon 13CR ribbon, and the lower channel 43L accommodates a 0.250 inch wide error correction ribbon 14. As illustrated in FIG. 2a, where a composite standard width 0.562 inch fabric two color ribbon 13TC is housed in cartridge 11 as will hereinafter appear, only a single channel 43S in each of the vibrator arms 42 will be provided with that cartridge 11 and the housings 31, 32 will not be vertically compartmented.

Entrance to the ribbon guide channels 43U, 43L and 43S to mount a ribbon or ribbons 13, 14 therein prior to snapping the walls 27 and 29 forming the front passageway 35 together is by way of horizontal slots 46 in the arms 42 communicating with the ribbon channels 43U, 43L and 43S.

With particular reference to FIG. 2 and FIG. 2a, the lower ends of the vibrator arms 42 are offset rearwardly forming a shoulder 47 whereby the ribbon-vibrator guide means 12 rests on the lower edge 48 of the frame opening 38. The common depending lower end 51 of the ribbon-vibrator guide means 12 is provided with a hollow chamber 52 (FIG. 3) for the reception of ribbon elevating means 23 operatively supported on the machine. The ribbon elevating means 23 as shown in FIG. 3 comprises vertically extending arms 53 and 54 with the arm 53 connected to a ribbon elevating crank rod 55 and with the arm 54 pivoted at its lower end to arm 53. A spring 56 biases the arms 53, 54 scissors-like to open position. The arms 53 and 54 extend through a guide slot 57 in a frame mounted part 58 which holds them together as shown for free reception of their upper ends 61 into the chamber 52 of the ribbon-vibrator guide means 12. When a character is typed, the crank rod 55 is oscillated and the ribbon elevating means 23 rises and carries the ribbon-vibrator guide means 12 upwardly. As the scissor-like arms 53, 54 rise, bevelled edges 62, 63 thereon are cammed by the guide slot 57 overcenter toward one another causing the hooked ends 61 thereof to overlies shoulders 64 formed by a restricted opening to the chamber 52. This serves to positively withdraw the ribbon-vibrator guide means 12 on the downward stroke of the ribbon-elevating means 23. In a preferred embodiment, both the ribbon elevating means 23 and the central portion

of the front passageway 35 are canted or tilted from the vertical towards the typewriter platen 22 on the order of 20° to facilitate loading of the cartridge 11 behind the type guide 21 on the machine.

A cartridge 11 as shown in FIG. 1 is designed to be held canted for top loading onto the platforms 15 and 16 with the ribbon-vibrator guide means 12 behind the type guide 21 for reception of the ribbon elevating means 23 and with the forward canted walls 27 of the cartridge housings 31, 32 engaging forwardly complementary canted walls 65, 66 on the platforms 15, 16 and with the canted rear wall 27' mating with angled rear walls 67, 68 on the platforms 15, 16. Abutments 71 on the front wall 27 of the cartridge housings 31, 32 are formed to push against and be latched by platform mounted latches 72 coupled by links 73 to cranks 74 which are rocked by operator controls 75 for releasing the latches 72 to remove a cartridge 11.

With reference to FIGS. 4-6, ribbon feed gears 76, 77 (FIGS. 4 and 5) and 78, 79 (FIG. 6) respectively are pivotally mounted in the upper left and lower right compartments 33L, 34R of cartridge housings 31, 32. With the cartridge 11 so mounted, the feed gears 76-77 and the ribbon-vibrator guide means 12 on the cartridge 11 will be engaged with their operative members in the machine, namely drive gears 17 and 18 and ribbon elevating means 23.

Referring now to FIG. 4 which shows the top cover 24 of the cartridge 11 of FIG. 1 removed exposing first level compartments 33L and 33R in the left and right housings 31 and 32 respectively, there is shown in the left housing 31 the pair of meshing inked ribbon feed gears 76, 77 pivotally mounted on pins 82 rising from wall 28. The feed gears 76, 77 are located at the upper right entrance 81 to the upper left compartment 33L of the housing 31. Each of the gears 76, 77 is provided with a circumferential groove intermediate its ends whereby to be embraced by C-shaped ribbon shedders 83 mounted on arcuate posts 84 upstanding from the center partition wall 28 defining the upper and lower level compartments 33, 34 of the housings 31, 32. As shown in FIG. 4, the shedders 83 prevent ribbon 13 from winding around the gears 76, 77 and serve to guide ribbon 13 exiting from the nip of the feed gears 76, 77.

When a cartridge 11 is to contain fabric ribbon 13FR in the upper level compartments 33L, 33R with error correction ribbon 14 in the bottom level compartments 34L and 34R, the fabric ribbon 13FR will be randomly stuffed in the left housing 31 and will be pulled leftwardly past the ribbon-vibrator guide means 12 into the left housing 31 between the pull type feed gears 76, 77. As shown in FIG. 4, the upper compartment 33L in the left housing 31 in a fabric ribbon cartridge 11 is provided with ribbon packing and guide partitions 85 and 86 extending from partition wall 28 which conform to the shape of the posts 84 and extend therefrom in the form of an elbow 87 leading from the ribbon shedders 83 which increases in width and joins the walls 27 connecting the housings 31, 32. This elbow 87 provides an initial constriction 88 wherein the randomly folded fabric ribbon 13FR will be stuffed. As the fabric ribbon 13FR is pushed toward and around the elbow 87, it enters a so-called explosion area 89 where it can expand rapidly and be easily pulled by the feed gears 76, 77 around through the rear hollow connector and guides 91 and 92 supported by the partition wall 28 in the

right housing 32 and through the ribbon-vibrator guide means 12 in the front walls 27 and 29 connecting the housings 31, 32.

Where the cartridge 11 is to contain a carbon ribbon 13CR and error correction ribbon 14 in upper and lower level compartments 33, 34 respectively, the partition wall 28 defining upper and lower level compartments 33, 34 respectively of the housings 31, 32, respectively is modified in the area of left housing 31 to allow accumulation of used carbon ribbon 13CR in both upper and lower compartments 33, 34 of the left housing 31.

With particular reference to FIG. 5, a spooled supply 93 of carbon ribbon 13CR will be rotatably mounted on a post 94 rising from the partition wall 28 into the upper compartment 33R of the right housing 32 and will be trained around guide 92 through the ribbon-vibrator guide means 12 and between feed gears 76, 77. In the left housing 31, the partition section 28 supports ribbon guide partitions 95 and 96 which extend upwardly to top cover 24 and downwardly to bottom wall 26. As shown a portion 97 of partition 95 extending into the upper compartment 33L extends from the front wall 27 and around posts 84. A second portion 98 of partition 95 reaching upwardly and downwardly into the upper and lower compartments 33, 34 respectively, extends laterally from the area of post 84 toward the end wall 27 of the housing 31 and curves around to the front wall 27 of the housing 31. Guide partition 96 similarly extends from section 28 into upper and lower compartments 33, 34, respectively with the extension into the upper compartment 33 beginning at the area of the post 84 associated with gear 77 and joining the forward wall 27' of the rear cartridge connector. Thus, as viewed in FIG. 5, partitions 95 and 96 flare outwardly from the outlet of the ribbon shedders 83 and spent carbon ribbon 13CR is accommodated in a space between the upper cover 24 and lower section 28 of the left housing 31 and the area between connecting walls 27' to a blocking wall 100 thus to accommodate as large an amount of spent carbon ribbon 13CR as possible.

In either a cartridge 11 with a fabric ribbon 13FR or carbon ribbon 13CR located in the upper compartment levels 33 of cartridge 11 illustrated in FIGS. 4 and 5, the lower compartment levels 34 can accommodate an error correction ribbon 14. With reference to FIG. 6, which shows the lower compartment levels 34L and 34R of the cartridge housings 31, 32 respectively exposed, the left housing 31 in the upper left corner mounts a spool 101 of error correction ribbon 14 which is trained over a guide 102 and through the lower channels 43L of the ribbon-vibrator guide means 12, a guide 92' depending from the partition section 28 into the lower level compartment 34R of the right housing 32, and between meshing feed gears 78, 79, mounted on pivot pins 99 as described in connection with fabric and carbon ribbon drive gears 76, 77 located in the left housing 31. The error correction pull gears 78, 79 are located in the upper left corner of the lower compartment level 34R in the right housing 32 and serve also to stuff the spent error correction ribbon 14 in the lower compartment level 34R of the right housing 32 guided by ribbon shedders 103 to preclude ribbon 14 wrapping around the gears 78, 79 after exiting therefrom.

As will be understood, either the left or right drive gears 17 or 18 will be indexed incident to a type action as selected by an operator control (not shown) linked to conventional ribbon reverse mechanism (not shown) and linked to conventional mechanism (not shown) for conditioning the throw of the ribbon elevating means 23 to position either the inked ribbon 13 or error correction ribbon 14 for printing.

The constructions of cartridge 11 may be formed entirely of and assembled from plastic and the various parts, e.g. the bottom section 25, horizontal compartment divider section 28, top cover 24, wall 29, gears 76, 77, 78, 79 shedders 83, 103, and ribbon-vibrator guide means 12 can be assembled after mounting the various ribbons 13 by snapping the parts together as by hollow posts 104 and pins 105 at appropriate locations.

The invention claimed is:

1. A ribbon cartridge to be operatively mounted in a typewriter having ribbon drive means and ribbon elevating means,

said cartridge comprising a first and a second housing, ribbon mounted in said first and second housings, and housing connectors having ribbon passageways communicating with openings in said housings, said connectors joining said housings in spaced apart relationship defining an opening between housings, prethreaded ribbon vibrator means slidably mounted midway of one of said connectors and engagable with and elevatable by said ribbon elevating means, and

ribbon feed means mounted in said first housing, said feed means being engagable with and drivable by said ribbon drive means to pull said ribbon from housing to housing through said vibrator means.

2. A ribbon cartridge as recited in claim 1, wherein said ribbon is an endless fabric ribbon randomly packed in said first housing, and said ribbon cartridge further includes means in said first housing for controlling the movement of said fabric ribbon from housing to housing through said vibrator means.

3. A ribbon cartridge as recited in claim 2, said means for controlling the movement of said fabric ribbon including a first, restricted passage in the first housing mounting said feed means leading from said feed means thereby to stuff ribbon in said first housing, and a second wider passage connected to said first, restricted passage to allow expansion of stuffed ribbon whereby said fabric ribbon can be easily pulled through said second housing and through said vibrator means.

4. A ribbon cartridge as recited in claim 1, wherein said ribbon is carbon ribbon spooled in said second housing, and having means in said first housing for storing spent carbon ribbon.

5. A ribbon cartridge as recited in claim 1, wherein said ribbon mounted in said first and second housings includes inked ribbon and error correction ribbon, and said second housing includes correction ribbon feed means operatively associated with said ribbon drive means.

6. A ribbon cartridge as recited in claim 1, said first and second housings each having upper and lower compartments, said ribbon comprising a supply of inked ribbon in an upper housing compartment, and a supply of error correction ribbon in a lower housing compartment, and each housing having ribbon feed means associated with said ribbons, both of said ribbon feed means being selectively operable to pull associated ribbon

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from said supplies into opposite housing compartments.

7. A cartridge as recited in claim 6, wherein said inked ribbon is a fabric ribbon whose supply is housed in said first housing, and wherein the supply of said error correction ribbon is housed in said first housing.

8. A cartridge as recited in claim 6, wherein said inked ribbon is carbon ribbon whose supply is housed

in said first housing, and wherein the supply of error correction ribbon is housed in said second housing.

9. A cartridge as recited in claim 6, said ribbon feed means including a pair of meshing gears in each of said housings.

10. A cartridge as recited in claim 9, including ribbon shedders located at the outlet nip of said gears.

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