

April 21, 1959

J. A. GRAY

2,883,029

TYPEWRITER RIBBON ATTACHMENT

Filed Feb. 25, 1957

3 Sheets-Sheet 1

Fig. 1

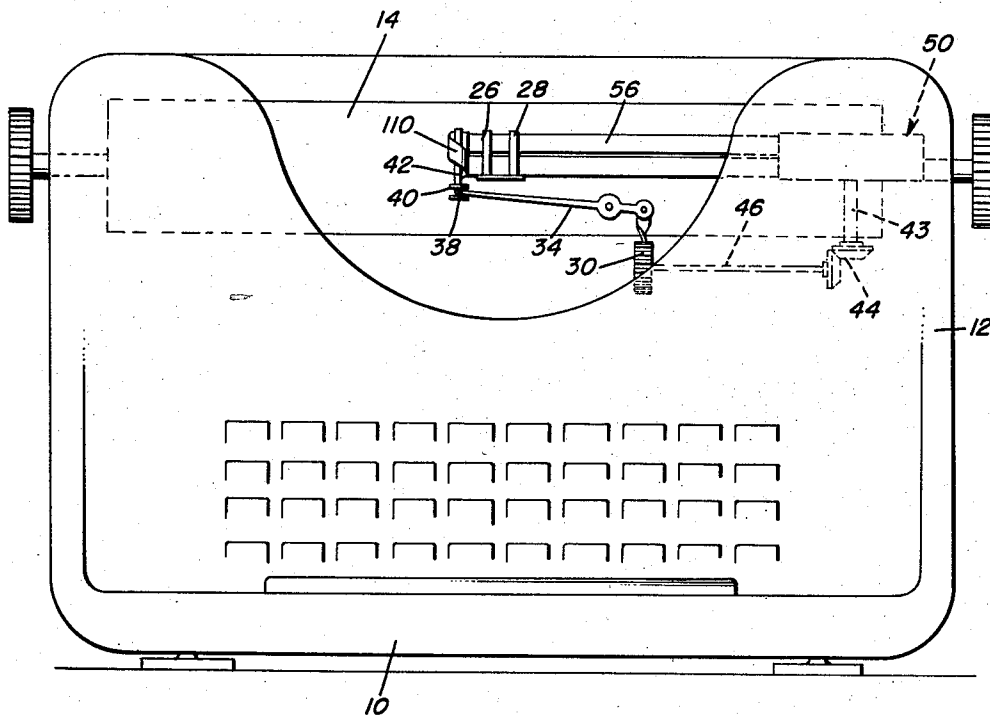
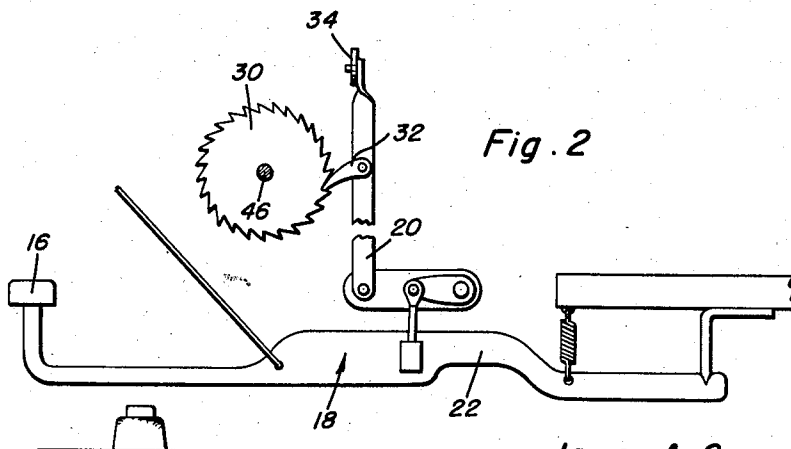


Fig. 2



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Fig. 3

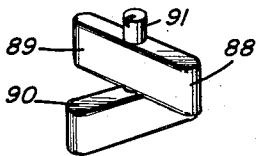
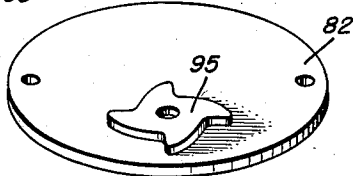
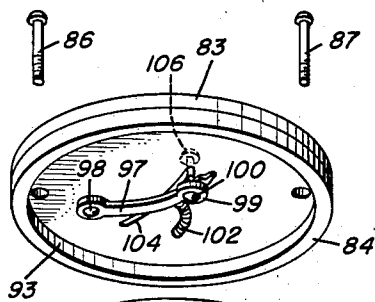
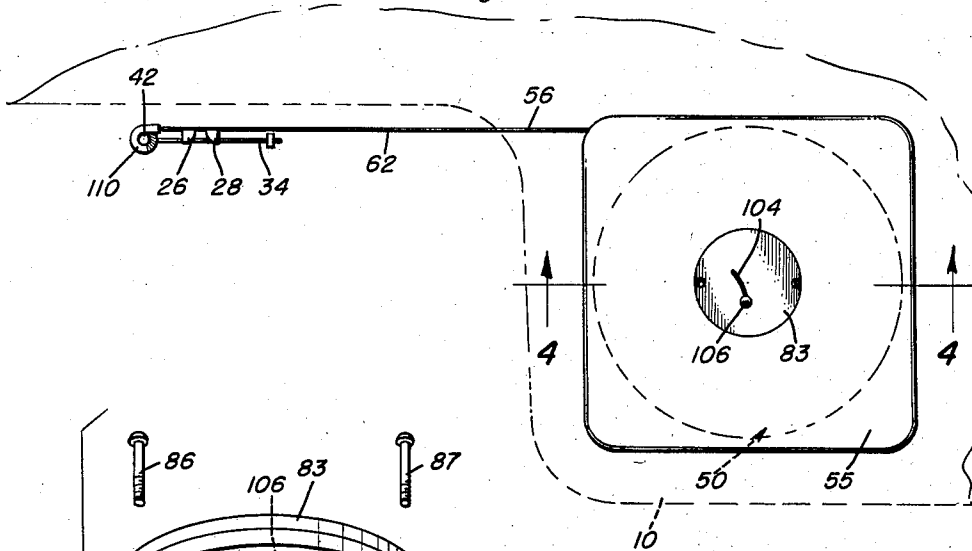


Fig. 7

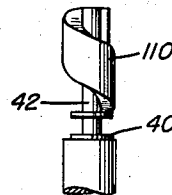
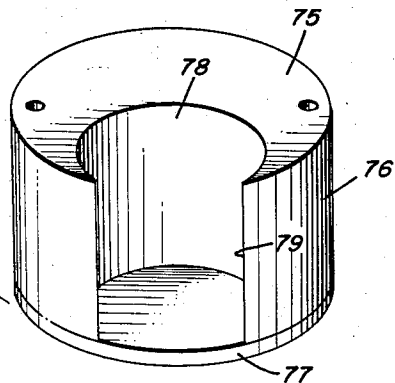


Fig. 8

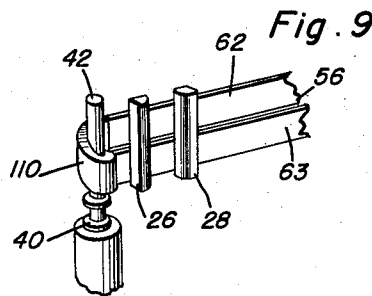


Fig. 9

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Fig. 4

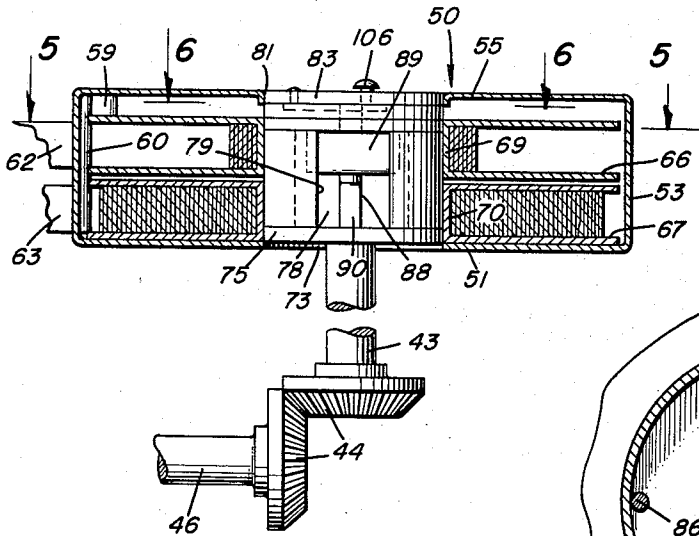


Fig. 6

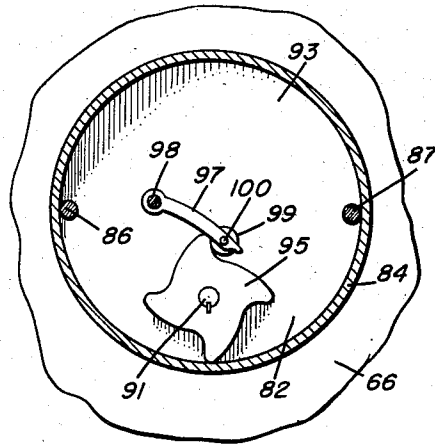


Fig. 5

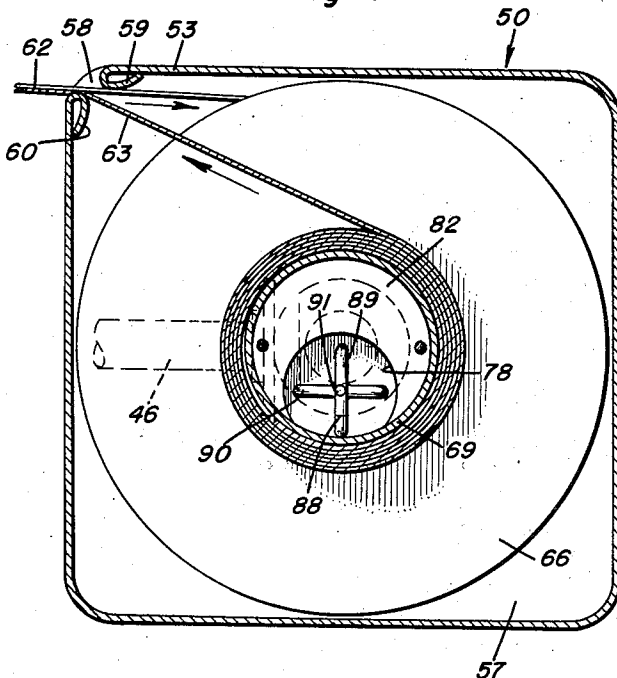
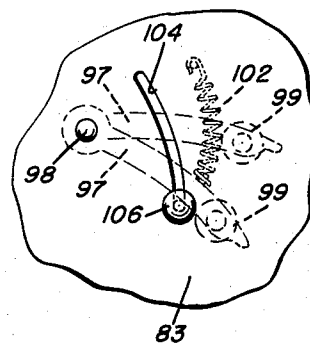


Fig. 10



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2,883,029

TYPEWRITER RIBBON ATTACHMENT

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11 Claims. (Cl. 197—162)

This invention relates to typewriters, and particularly to a structure by which the typewriter ribbon is quickly and easily installed or removed without the necessity of actually touching the ribbon.

An object of the invention is to provide a typewriter spool winding shaft with a carrier that functions with an attachment fitted in the recess occupied by a typewriter ribbon spool and encasing two freely rotatable spools that have been rewound with a typewriter ribbon and that have an intermediate part of the ribbon passed through a typewriter ribbon passage in the casing for engagement with the ribbon elevator. In this way the typewriter ribbon is withdrawn from the casing and located behind the key guides and over the ribbon elevator, leaving the ribbon spool winding shaft free to operate my novel ribbon feeding attachment.

A more particular object of the invention is to provide a typewriter ribbon attachment for an ordinary typewriter which is fitted with a carrier, the attachment having two freely rotatable ribbon spools that are rewound with ribbon and that are constrained in their movement by a casing, one spool being driven in order to present a continually changing supply of ribbon to the keys during the ordinary operation of the typewriter, while the other spool is capable of free rotation so as to unwind. When the freely movable spool becomes emptied, the end of the ribbon associated with that spool does not separate from the spool inasmuch as it is attached to that spool. This causes a drag to be applied on the driven spool and this drag is used to trigger and actuate a clutch in the carrier, moving the clutch to a new position which enables the previously driven spool to idle freely in the casing and which drives the previously freely rotatable spool in the opposite direction, thereby rewinding the ribbon thereon. In this way the ribbon automatically winds and unwinds from one spool to the other and this process is repeated until it is found necessary to renew the ribbon due to mechanical failure of the ribbon or more usually, exhaustion of the ink supply thereon.

Another object of the invention is to provide a typewriter ribbon attachment which, when used with the above-mentioned carrier, is capable of automatically winding and rewinding from one spool to another, both spools being very conveniently and compactly encased. The attachment requires no adjustment during the complete life of the ribbon and occupies space on one side only of the typewriter. The attachment is capable of application to existing typewriters with very little alteration and will operate without modification of the key controlled mechanism or other parts of the typewriter not immediately concerned with the ribbon feed and handling parts of the typewriter.

Another object of the invention is to provide a typewriter ribbon feeding and handling attachment which automatically winds and unwinds the ribbon from one spool to another, both spools being located in an easily applied and removed casing and feeding the ribbon behind the typewriter key guides and around the ribbon

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elevating pin, there being means on the ribbon elevating pin for directing the ribbon so that parts thereof are above and below each other respectively behind the key guides as the ribbon is fed from the first spool to the second spool until the first spool is emptied at which time the ribbon is automatically fed from the second spool to the first spool, whence a new cycle of feeding from the first to the second spool commences.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a front elevation and partially schematic representation of an ordinary typewriter having an attachment that is constructed in accordance with the invention, mounted operatively therein;

Figure 2 is another elevational and largely schematic view illustrating one mechanism to elevate the ribbon each time one of the keys of the typewriter is actuated;

Figure 3 is a top view of the typewriter and attachment of Figure 1;

Figure 4 is an enlarged sectional view taken approximately on the line 4—4 of Figure 3;

Figure 5 is a sectional view taken approximately on the line 5—5 of Figure 4;

Figure 6 is a sectional view in an enlarged scale and taken on the line 6—6 of Figure 4;

Figure 7 is an exploded perspective view of the clutch and associated mechanism constituting part of the invention;

Figure 8 is an end elevational view of the ribbon elevator and elevating pin of the typewriter;

Figure 9 is a perspective view of the ribbon elevator, elevating pin and key guides and showing fragmentarily the ribbon which is operatively associated therewith; and,

Figure 10 is a fragmentary top view of the manual means to release the clutch in the typewriter ribbon attachment.

The typewriter 10 is intended to exemplify a standard electrically or mechanically operated typewriter and includes among other structure, the frame 12, platen 14, keys 16 (Figure 2) and the type operating mechanism 18 which is of standard construction. This mechanism 18 has a structural arrangement operatively connecting the key support lever 22 with the type in such manner that upon depression of key 16, its type is brought forward toward platen 14 between key guides 26 and 28 (Figure 9). At the same time ratchet wheel 30 is revolved slightly by pawl 32 on link 20 (Figure 2), and the movement of the lever 22 is imparted by link 20 to rocker arm 34 which has a yoke 38 at the outer extremity thereof and fits between the spaced collars 40 of the ribbon elevating pin 42. The ribbon elevator is designed to lift the ribbon of the typewriter each time that a key is struck and to permit the ribbon to be lowered after the key has completed its work stroke. The above described structure is conventional or schematically represents standard construction in many typewriters that are and have been commercially available for a number of years. Most typewriters have a ribbon spool on the right and a ribbon spool on the left side, with the ribbon passed behind the key guides. Ordinarily, the shaft 43 is mounted at one side of the typewriter and is driven by the operation of the keys of the typewriter, for example, by having miter gears 44 connecting shaft 43 to shaft 46, and shaft 46 being secured to ratchet wheel 30. One ribbon spool will idle while the other pulls the ribbon in unison with the operation of the keys of the typewriter.

My attachment 50 for the typewriter is an automatic winding and rewinding device for feeding the ribbon 56 back and forth between the pair of spools without the necessity of ever touching the ribbon or renewing the ribbon or in any way adjusting the ribbon until the ribbon has become exhausted through typewriter use. Attachment 50 has a casing having a bottom wall 51, and a top wall 55 that is attached to the side wall 53. The casing is separable from the typewriter and is replaced when a new ribbon is required. Ribbon passage 58 is in the side wall 53 (Figure 5) and has rounded guides 59 and 60 along the side edges thereof so that the upper and lower parts 62 and 63 of the ribbon 56 are guided in their travel in and out of the passage 58. Two independently and freely rotatable spools 66 and 67 are confined in the casing, and they have the two ends of the ribbon 56 secured to the hubs 69 and 70 of the spools. The casing together with the spools and ribbon is placed in and separable from the typewriter as a unit, and in the space normally occupied by the ribbon spool. Bottom wall 51 of the casing has a hole 73 through which the carrier 75 on shaft 43 passes when the casing is placed on the typewriter.

Carrier 75 is mechanically connected with the typewriter and is made of a block, frame or other structure with a cylindrical side wall 76 and a bottom wall 77 with which shaft 43 is connected. An off-center bore 78 is in the carrier 75 and has a lateral opening 79 over which a part of the inner surface of each of the hubs 69 and 70 is arranged. In assembly, the casing is placed in the typewriter with the carrier 75 passing through hole 73 and fitting in the central opening 81 in the top wall 53 of the casing. Plate 82 is mounted on the top surface of the frame of carrier 75, and there is a cover 83 over plate 82. Skirt 84 on cover 83 depends around the marginal edge of the plate 82. Cover 83, plate 82 and carrier 75 are held assembled by means of a pair of bolts 86 and 87 passing through holes in the cover plate 83 and plate 82 and threaded in the tapped bores in carrier 75.

Clutch 88 is located in the bore 78 and is constructed of two rubber paddles 89 and 90 arranged at right angles to each other and having rounded ends. Shaft 91 is rigidly fixed to the paddles 89 and 90, holding them at right angles to each other, and is passed through an aperture in plate 82 so that the upper extremity thereof terminates in the chamber 93 and is closed by the skirt 84 and the cover 83, together with plate 82. Cam 95, preferably in the form of a star wheel, is keyed to the end of shaft 91 in chamber 93 and is used to establish a drive connection between carrier 75, clutch 88 and a selected spool 66 and 67. Yet, the star wheel 95 and arm 97 which is associated with it enable the clutch 88 to be shifted to new positions, one position being where there is a drive connection between clutch 88 and spool 67 and the other position being where there is a drive connection established between clutch 88 and spool 66.

Arm 97 is mounted for oscillation on pivot pin 98 at one end of the arm and carried by cover plate 83. Cam follower, in the form of roller 99, is mounted on a pin 100 at the opposite end of arm 97 and is in contact with the periphery of the star wheel 95. Spring 102 is attached at one end to the cover plate 83 and is engaged at the other end on arm 97 intermediate the ends of the arm. The bias of the spring is in a direction to push the cam follower 99 firmly against the periphery of star wheel 95. Curved slot 104 is formed in the cover plate 83 and has a finger grip 106 passed therethrough, the finger grip having a pin in contact with the arm 97 in order to manually adjust the arm by moving it away from star wheel 95 and against the compression resistance of spring 102. Lateral opening 79 in the side wall 76 of carrier 75 enables the ends of the clutch paddles 89 and 90 to be brought forcibly to bear against the inner surfaces of the hubs 69 and 70 of the spools 67 and 66.

A combination ribbon elevator and guide 110 has a passage through which the ribbon 56 is passed. Guide

110 is in the general shape of a spiral or S and has a passage approximately rectangular in cross section at any point between the two open ends of the guide. Guide 110 separates the upper and lower parts 62 and 63 of the ribbon 56 by having the ribbon threaded therethrough, the parts of the single ribbon being parallel (Figure 1). Combination elevator and guide 110 is slipped over pin 42 and is raised and lowered each time that the rocker arm 34 is oscillated, thereby lifting and lowering the typewriter ribbon each time that a typewriter key is depressed. The operation of a typewriter which has a ribbon attachment constructed in accordance with my invention is unaltered insofar as the key actuation and results are concerned. However, the ribbon need not be renewed until such time that the physical fibers of the ribbon become deteriorated or until the ink supply on the ribbon is exhausted. These ends are achieved by using the attachment in the following way.

The casing is held in one hand with the pre-wound ribbon on a first spool 67 and having the opposite end attached to the second spool 66 with an intermediate part of the ribbon and guide 110 on the outside of the casing but held by the ribbon 56 which is threaded through the passage of guide 110. The other hand of the typist is used to pull the guide 110 from the casing thereby paying out a small length of ribbon 56 with guide 110 automatically separating the ribbon into an upper and lower part. The guide is placed on elevating pin 42 with both parts of the ribbon behind the key guides 26 and 28. The casing with its enclosed spools, is then deposited in the recess with carrier 75 passing into the casing. Finger-grip 106 is actuated to turn the clutch to a position where the paddles will not contact the inner surfaces of the spool hubs during both loading and unloading. After loading, as the keys of the typewriter are struck, it is desired that the ribbon be withdrawn from the first spool 67 by rotating the second spool 66 and therefore the clutch 88 is assumed to be in a position that the upper rubber paddle 89 thereof has one end pressed tightly and squashed slightly against the surface of hub 69, the opening 79 allowing access of the clutch to the hubs of the spools 66 and 67. Accordingly, as shaft 43 rotates through the standard typewriter drive mechanism, the carrier 75 revolves, thereby driving the clutch bodily in a circular path the drive being established between arm 97 and star wheel 95. This means that the second spool 66 will be driven with the carrier 75 and in one direction, while the first spool 67 is free to rotate (clutch 88 being disengaged from spool 67) paying out ribbon 56 as it moves through guide 110 and returns to be wound on spool 66.

When the ribbon 56 is drawn from the first spool 67 and reaches the end thereof, since this end is attached to the spool 67 and spool 66 continues to be driven by clutch 88, the clutch 88 slips, having arm 97 push it in a rotary manner about shaft 91 as an axis of rotation and thereby separating the rubber paddle 89 of clutch 88 from hub 69 and bringing rubber paddle 90 of the clutch into contact with the hub 70 of the first spool 67. This takes place by the drag caused at the end of the withdrawal of the ribbon from the spool. Then, once the clutch has been rotated 90 degrees, the other spool becomes the driver, with the remaining spool idling to enable the ribbon to be unwound therefrom. These cycles of operation continue indefinitely so long as the typewriter is in operation.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a typewriter which has a ribbon spool winding

shaft, a ribbon attachment comprising a casing, a first and a second freely rotatable prewound ribbon spool in said casing, said casing having a ribbon passage through which an intermediate part of the ribbon is adapted to pass, means driven by said shaft for rotating said first spool until the second spool is emptied and then rotating said second spool to rewind the ribbon thereon from the first spool, said spool rotating means including a carrier, a clutch engageable with selected spools and carried by said carrier, means releasably pressing said clutch against said selected spools and including a spring urged arm mounted on said carrier, and a mechanical member secured to said clutch and contacted by said arm to press said clutch in one direction whereby said clutch is brought into contact with said selected spools but enabling said mechanical member to override said arm when said clutch is shifted from one spool to the other spool.

2. In a typewriter, a ribbon attachment comprising a casing having a passage, a first and a second spool mounted for free rotation in said casing, a ribbon on the first spool and extending through said passage and returned into said casing and attached to the second spool, a rotatable clutch driven by the typewriter and disposed in said casing and drivingly connected to said second spool in order to draw the ribbon through said passage and thereby unwind said first spool and wind the ribbon on said second spool, said clutch including a pair of resilient members at right angles to each other, a carrier mounted for rotation on said casing and adapted to be actuated in response to key operation of the typewriter, and means drivingly connecting said clutch to said carrier to rotate said clutch bodily and thereby rotate the spool with which the clutch is engaged.

3. The attachment of claim 2 wherein said ribbon is secured at its ends to said first and said second spools so that when the unclutched spool has been completely unwound, the ribbon produces a resistance to further movement thereby overriding the clutch when said carrier is rotated further and engaging said clutch with the said unclutched spool and disengaging the clutch with the previously clutched spool, causing the ribbon to rewind on the now clutched spool.

4. In an attachment for a typewriter, the combination of a casing, a pair of freely rotatable spools in said casing, a clutch drivingly connected to one of said spools and disposed within said casing, a ribbon mounted on the unclutched spool and having one end secured thereto and the opposite end secured to the other spool, whereby upon actuation of said clutch the ribbon is paid out from said unclutched spool and wound on said clutched spool until the unclutched spool has been substantially completely unwound, at which time the ribbon exerts a pulling force, and means in said casing and responsive to said pulling force for shifting said clutch to a new position in said casing at which said freely rotatable spool is clutched and the previously engaged spool is released for free rotation.

5. In an attachment for a typewriter, the combination of a casing, a pair of freely rotatable spools mounted in said casing, a clutch drivingly connected to one of said spools, a ribbon mounted on the unclutched spool and having one end secured thereto and the opposite end secured to the other spool, whereby upon actuation of said clutch the ribbon is paid out from said unclutched spool and wound on said clutched spool until the unclutched spool has been substantially completely unwound, at which time the ribbon exerts a pulling force, means in said casing and responsive to said pulling force for shifting said clutch to a new position at which said freely rotatable spool is clutched and the previously engaged spool

is released for free rotation, said ribbon having an intermediate portion on the exterior of said casing and said ends in said casing, and a combination typewriter ribbon guide and elevator intermediate the ends of said ribbon and adapted to be raised and lowered in response to operation of the typewriter keys.

6. In an attachment for a typewriter, the combination of a pair of freely rotatable spools, a clutch drivingly connected to one of said spools, a ribbon mounted on the unclutched spool and having one end secured thereto and the opposite end secured to the other spool, whereby upon actuation of said clutch the ribbon is paid out from said unclutched spool and wound on said clutched spool until the unclutched spool has been substantially completely unwound, at which time the ribbon exerts a pulling force, means responsive to said pulling force for shifting said clutch to a new position at which said freely rotatable spool is clutched and the previously engaged spool is released for free rotation, and a combination typewriter ribbon guide and elevator intermediate the ends of said ribbon and adapted to be raised and lowered in response to operation of the typewriter keys, said combination guide and elevator being approximately S-shaped and having open ends together with a passageway between said open ends through which the ribbon is passed, thereby holding said ribbon in a position with one part thereof above another.

7. In a typewriter attachment, the combination of a casing in which there are two spools mounted for free rotation, a carrier having an opening, said spools having hubs in which said carrier is disposed, a clutch rotatably mounted eccentrically in said carrier and having resilient clutch members arranged to pass through said opening and drivingly connect to said hubs, means for rotating said carrier in one direction, and means drivingly connecting said clutch to said carrier for movement of said clutch bodily together with said carrier, thereby rotating a first of said spools and leaving the other of said spools free to rotate in said casing until the ribbon is paid therefrom, whereupon the ribbon being attached to said other of said spools exerts a resistance to rotation of said first spool and causes the clutch member to slip therefrom by rotating said clutch about an axis of rotation and by bringing another clutch member of said clutch into contact with the hub of said second spool and thereby drivingly coupling said clutch with said second spool and rewinding the typewriter ribbon thereon.

8. The attachment of claim 7 wherein said casing has a passage through which an intermediate part of said ribbon passes, and a ribbon guide attached to the part of said ribbon which is exterior of said casing.

9. The attachment of claim 8 wherein said casing has guide surfaces on opposite sides of said passage over which the ribbon is adapted to pass.

10. The attachment of claim 7 and means connected with said clutch for resiliently pushing said clutch to a position wherein the resilient clutch members thereof press firmly against said hubs of said spools.

11. The attachment of claim 7 and means connected with said clutch for resiliently pushing said clutch to a position wherein the resilient clutch members thereof press firmly against said hubs of said spools, and manually operable means connected with the last mentioned means for manually moving said clutch to enable adjustment thereof.

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