United States Patent

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[72] Inventor **Hilding A. Anderson**
Lake Zurich, Ill.

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[73] Assignee **SCM Corporation**
New York, N.Y.

[54] **INK-RIBBON FEEDING AND REVERSING ASSEMBLY**
19 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **197/165,** 101/336
[51] **Int. Cl.** **B41j 33/44**
[50] **Field of Search** 197/91, 114, 120, 151, 153, 153.5, 160, 161, 162, 163, 164, 165, 175; 101/336

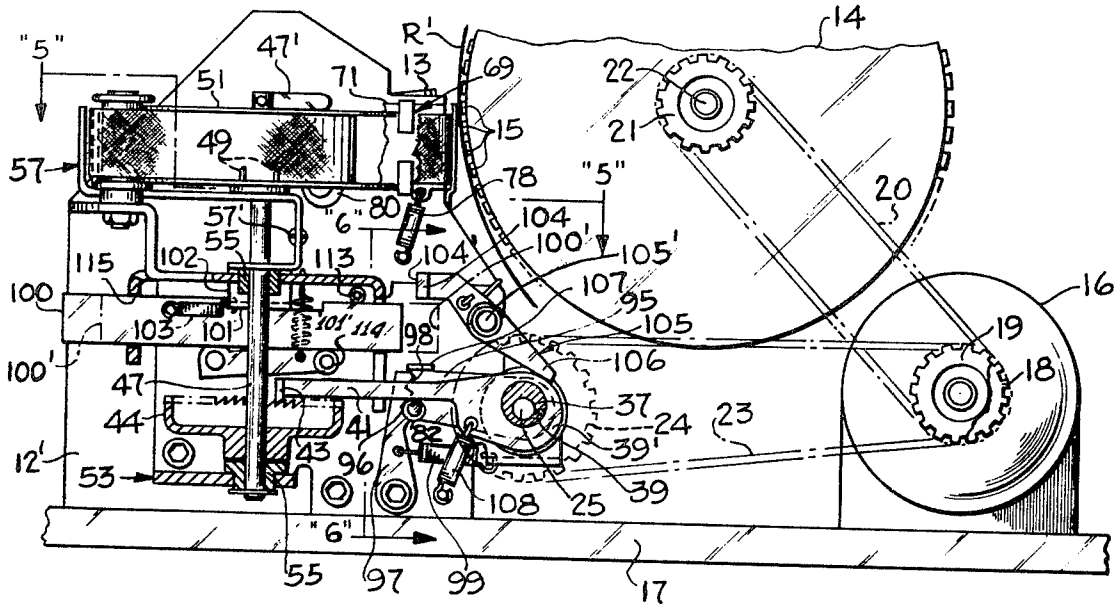
[56] **References Cited**

UNITED STATES PATENTS

997,615	7/1911	Gammeter	197/162
1,046,711	12/1912	Alexander	197/151
1,713,277	5/1929	Goldberg et al.	197/175UX
1,780,630	11/1930	Page	197/151
2,636,590	4/1953	Rice	197/153
2,667,256	1/1954	Madsen	197/114
2,672,092	3/1954	Beattie	101/336
2,701,045	2/1955	Madsen	197/91
2,724,332	11/1955	Schlessiger et al.	101/336
2,858,928	11/1958	Bristoll	197/165
3,184,028	5/1965	Kleinschmidt et al.	197/161
3,244,092	4/1966	Gottscho et al.	101/336X
3,295,655	1/1967	Landgraf	197/151X
3,340,989	9/1967	Busch	197/165
3,438,476	4/1969	Hare et al.	197/120X

Primary Examiner—Ernest T. Wright, Jr.
Attorney—Joseph J. Grass

ABSTRACT: There is disclosed an ink-ribbon feeding and reversing assembly with a pair of ratchet wheels and a respective pair of drive pawls. The rachet wheels drive respective ribbon carriers. The ribbon is driven in one direction when one of the pawls is in driving engagement with one rachet wheel, the other pawl being held out of driving engagement with the other ratchet wheel. An electric motor continuously drives a drive shaft through a clutch. The drive shaft carries a pair of eccentrics which are directly connected to the pair of pawls. An eyelet at each end of the ribbon actuates an associated sensing lever. When either one of the sensing levers is actuated it operates a respective interposer. Each pawl drives an actuator. When either interposer is moved into the path of its respective actuator, a reversing control device is operated to switch the direction of ribbon feed. The reversing control device includes a tubular control shaft received by the drive shaft. Control members, interconnected by the control shaft, enable engagement of one drive pawl and one detent pawl with one ratchet wheel and hold the other drive pawl and another detent pawl out of engagement with the other ratchet wheel.



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Fig. 1

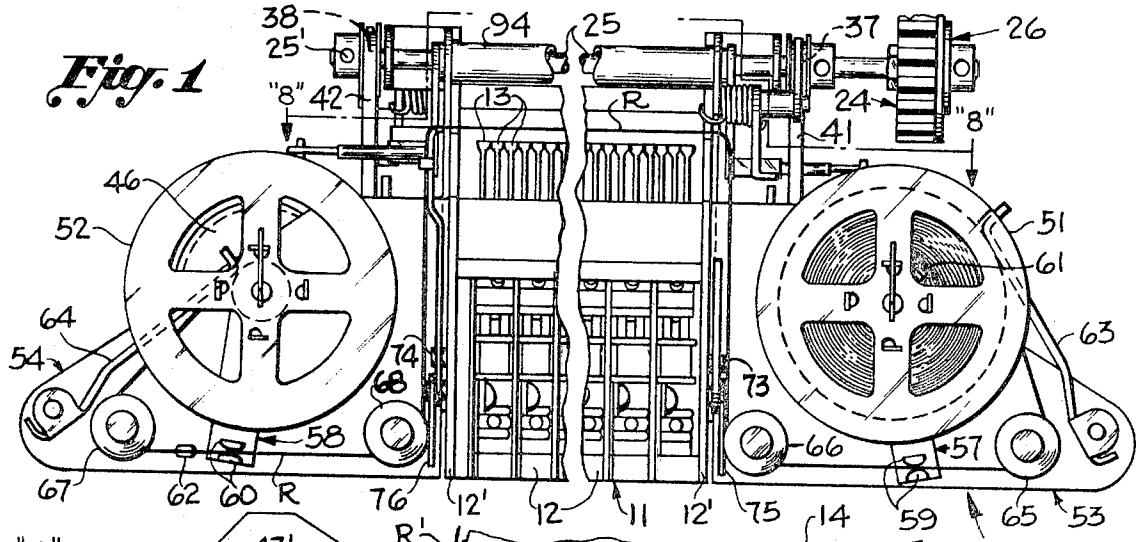


Fig. 2

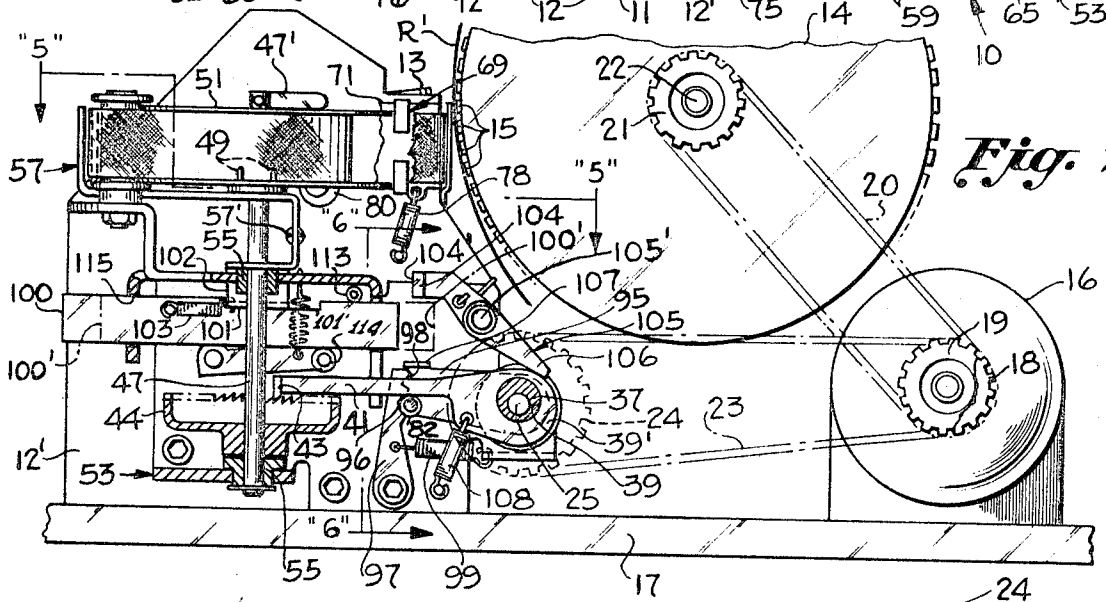


Fig. 3

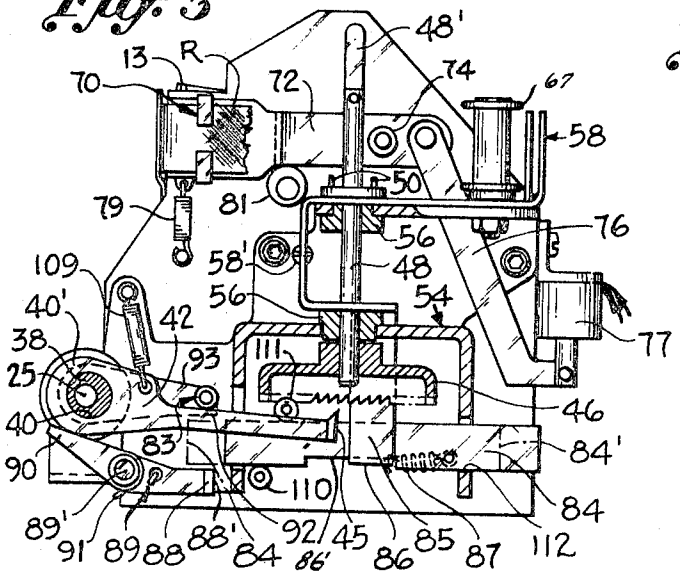
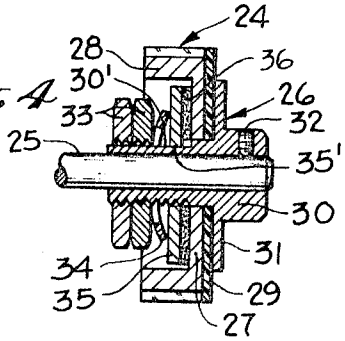


Fig. 4



Inventor

HILDING A. ANDERSON

Joseph J. Grasso

Attorney

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Fig. 5

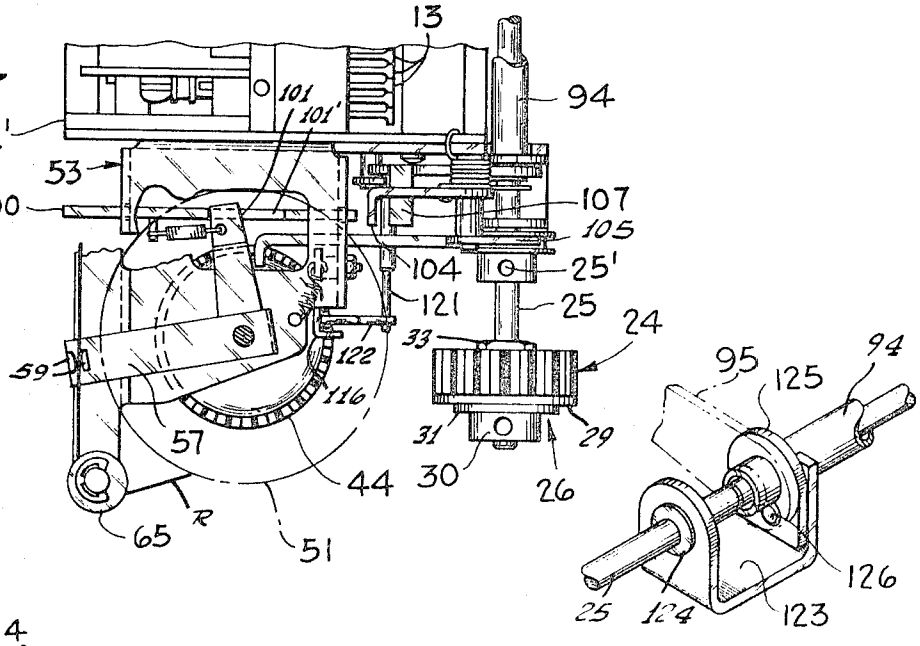


Fig. 6

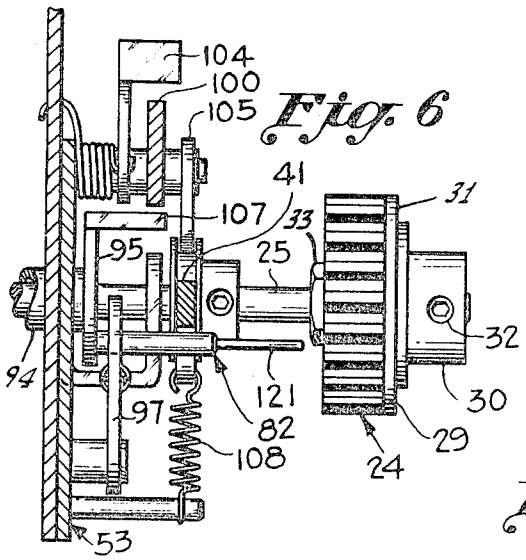


Fig. 9

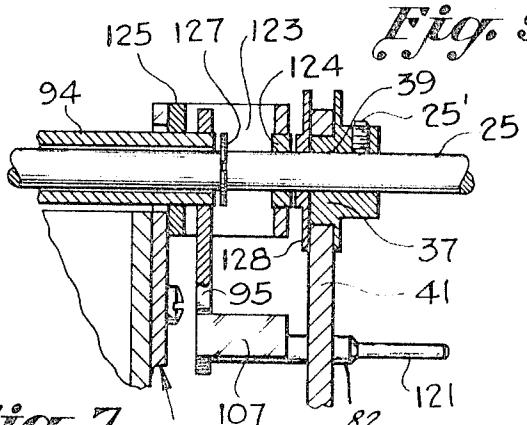
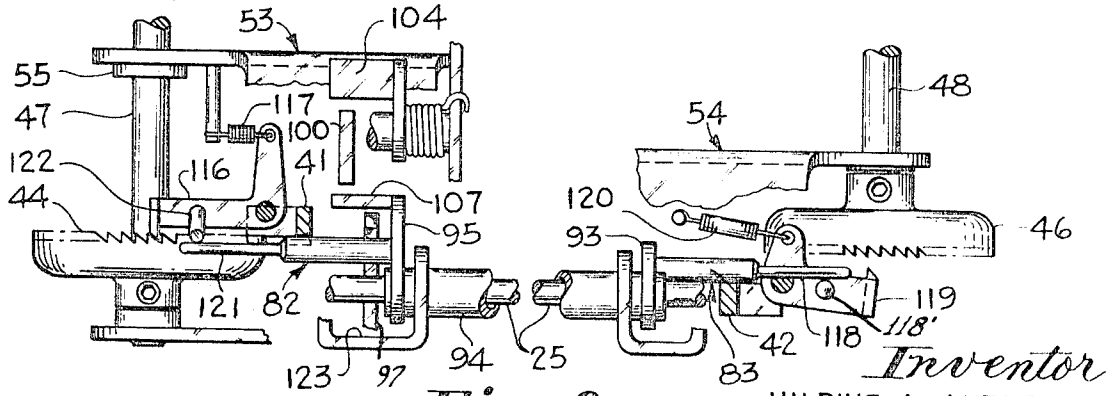


Fig. 7

Fig. 8



Inventor

HILDING A. ANDERSON

Joseph J. Grass

Attorney

INK-RIBBON FEEDING AND REVERSING ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the art of ink-ribbon feeding and reversing assemblies for printers.

2. Description of Prior Art

Various pawl and ratchet driven ribbon carriers, and various ribbon eyelet operated reversing devices are known in the art.

SUMMARY OF THE INVENTION

The invention comprises a novel arrangement of pairs of ribbon carriers, ratchet wheels, drive pawls, sensing members, interposers, actuators, and a switching device for effecting engagement of one pawl with its respective ratchet wheel and for effecting disengagement of the other pawl with its respective ratchet wheel. Switching is accomplished under the control of either sensing member. When one of the sensing members is actuated it moves its respective interposer from an inactive position to an active position in the path of the respective actuator. The actuator drives the interposer which in turn drives the switching device to effect movement of the ribbon in the reverse direction.

Each pawl is driven by an eccentric connection between a drive shaft and the pawl. In addition, each pawl is guided so that its drive end, which engages the respective ratchet wheel, makes a smooth orbital movement.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a top plan, broken away, view showing an ink-ribbon feeding and reversing assembly in conjunction with a printer;

FIG. 2 is an elevational view showing the right side of the ink-ribbon feeding and reversing assembly and printer shown in FIG. 1, but showing in addition a print drum and a drive train for the print drum and the ink-ribbon feeding and reversing assembly;

FIG. 3 is an elevational view showing the left side of the ink-ribbon feeding and reversing assembly and printer shown in FIG. 1, with one ribbon carrier being omitted for the sake of clarity;

FIG. 4 is a sectional view of a pulley and friction clutch shown in FIG. 1;

FIG. 5 is a sectional view taken along line 5–5 of FIG. 2;

FIG. 6 is a sectional view taken along line 6–6 of FIG. 2;

FIG. 7 is a fragmentary horizontal sectional view through the end of the ink-ribbon feeding and reversing assembly shown in FIG. 6;

FIG. 8 is a sectional view taken along line 8–8 of FIG. 1; and

FIG. 9 is a fragmentary perspective view of a drive shaft, a reversing control shaft, a U-shaped portion of a mounting bracket, and a keeper, also shown in FIGS. 6 and 7 for example.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the FIG. 1 of the drawing, there is shown an ink-ribbon feeding and reversing assembly generally indicated at 10, for use in conjunction with a printer generally indicated at 11 having a print hammer assembly 12 with a bank of print hammers 13 and a print drum 14 having longitudinally extending rows of type characters 15 with which the print hammers 13 cooperate. While the assembly 12 is shown in conjunction with the printer 11 which has a bank of print hammers 13 and a rotatably mounted drum 14, it is also useful with a carriage-type printer (not shown).

Print hammer assembly mounting structure 12' and a drive motor 16 are shown to be mounted by the printer frame 17. The motor 16 drives a pair of toothed pulleys 18 and 19. The pulley 18 drives a toothed belt 20 which in turn drives a toothed pulley 21 secured to drive shaft 22 of the drum 14. The drive shaft 22 is journaled in suitable bearings (not shown) mounted by the printer frame 17. The pulley 19 drives a toothed belt 23 which in turn drives a toothed pulley 24. The pulley 24, which is shown in phantom lines in FIG. 2, drives a drive shaft 25 through a friction clutch generally indicated at 26. The clutch 26 limits the amount of torque which can be applied to the shaft 25 by the pulley 24. The pulley 24 comprises a hub portion 27 and a toothed rim 28. One end of the pulley 24 is in abutting relationship with a disc or plate 29 composed of a suitable material, for example nylon. A hub 30 receives the pulley 24 plate 29. The hub 30, which has a flange 31 in abutment with the plate 29, is secured to the shaft 25 by a setscrew 32. Nuts 33 threadably received by the hub 30 bear against a spring 34 which in turn bears against a pressure plate 35. The plate 35 has a noncircular bore formed by a flat 35' which matches a flat 30' on the outer surface of the hub 30. Thus, the plate 35 can move axially relative to the hub 30, but cannot rotate relative to the hub 30. The plate 35 presses a friction disc 36, composed for example of felt, against the hub portion 27. The amount of torque which can be applied to the shaft 25 by the pulley 24 can be either decreased or increased by loosening or tightening the nuts 33. As soon as the torque becomes too great, slippage occurs between the pulley 24 and the flange 31 and/or between the pulley 24 and the pressure plate 35.

The shaft 25 has a pair of eccentrics 37 and 38 suitably secured to it as by setscrews 25'. Eccentrics 37 and 38 are shown to comprise circular discs or bearings. The eccentrics 37 and 38 are received in circular bores 39 and 40 in respective pawls 41 and 42. The pawl 41 is shown in FIG. 2 to have a drive end 43 in driving engagement with a ratchet wheel 44, and the pawl 42 is shown in FIG. 3 to have a drive end 45 out of driving engagement with a ratchet wheel 46. The ratchet wheel 44 is secured to a drive spindle 47, and the ratchet wheel 46 is secured to a drive spindle 48. Drive lugs 49 and 50 are secured to respective drive spindles 47 and 48. The drive lugs 49 engage with and drive an ink-ribbon carrier 51 in the form of a ribbon spool, and the drive lugs 50 engage with and drive an ink-ribbon carrier 52 in the form of a ribbon spool.

The ends of the spindles 47 and 48 have respective keepers 47' and 48'. The drive spindles 47 and 48 are shown to extend in an upward direction and are rotatably mounted by respective brackets 53 and 54 by spaced-apart respective bearings 55 and 56. Sensing levers 57 and 58 have respective pins 59 and 60 which provide narrow slots through which the ribbon R can pass freely. The ribbon R has an eyelet 61 secured to its one marginal end and an eyelet 62 secured to its other marginal end. When the ribbon R is almost fully wound on the ribbon carrier 51 and is almost fully unwound from the ribbon carrier 52 as shown in FIG. 1, the eyelet 62 urges sensing lever 58 counterclockwise. Conversely, when the ribbon R is almost fully wound on the ribbon carrier 52 and is almost fully unwound from the ribbon carrier 51, the eyelet 61 drives the sensing lever 57 clockwise (FIG. 1). Conventional spring-urged levers 63 and 64 bear against the portion of the ribbon R which is wound on respective ribbon carriers 51 and 52 and serve as brakes. Upstanding guide rollers 65 and 66 mounted by the bracket 53 normally guide the ribbon R through the center of the slot formed by pins 59, and upstanding guide rollers 67 and 68 mounted by the bracket 54 guide the ribbon R through the center of the slot formed by the pins 60. The ribbon R passes through guides 69 and 70 formed on pivotally mounted arms 71 and 72. The arms 71 and 72 are pivoted at respective pivots 73 and 74. The arms 71 and 72 are pivotally connected to links 75 and 76. The lower end of the link 76 is driven downwardly when solenoid 77 is energized and another identical solenoid (not shown) drives the lower end of the link 75 downwardly when energized; these solenoids are energized simultaneously, and thereupon arms 71 and 72 are simultaneously pivoted against the forces of respective springs 78 and 79 so that the ribbon R is moved upwardly (FIG. 2) between the print faces of the print hammers 13 and the record medi-

um R'. When the character or characters have been printed by one or more of the print hammers 13 cooperating with one or more respective characters on the print drum 14, these solenoids are no longer energized and the springs 78 and 79 and the portion of the ribbon R which they lift return respective arms 71 and 72 to their positions shown in FIGS. 2 and 3. Adjustable eccentric-type stops 80 and 81 define the rest positions for the arms 71 and 72.

With the pawls 41 and 42 in positions shown in FIGS. 2 and 3, when the motor 16 drives the shaft 25 via pulleys 19 and 24 and belt 23, the pawl 41 which is guided by the guide and control member 82 drives the ratchet wheel 44, and the pawl 42 which is guided by the guide and control member 83 moves in a path out of engagement with respective ratchet wheel 46. Drive ends 43 and 45 of respective pawls 41 and 42 move in orbital paths as do hubs or hub ends 39' and 40'. Considering the pawl 41, as the shaft 25 rotates the eccentric 37 causes drive end 43 to be cammed to the left as viewed in FIG. 2, thereby driving the ratchet wheel 44, and thereafter the eccentric 37 in conjunction with control member 82 causes drive end 43 to lift out of engagement with the ratchet wheel 44 and thereafter to move into engagement with the next successive tooth of the ratchet wheel 44. The pawl 41 will continue driving the ratchet wheel 44 until eyelet 62 pivots the sensing lever 58 counterclockwise (FIG. 1). Thereupon, the sensing lever 58 which is pivotally mounted by and with respect to the drive spindle 48 pivots against the force of spring 58' and urges an interposer 84 to the left (FIG. 3) to the position indicated by phantom lines 84'. The sensing lever 58 has a depending portion 85 with a lateral extension 86. A tension spring 87 is connected to the extension 86 and to the interposer 84 to provide a yieldable connection. With the interposer 84 in the position indicated by phantom lines 84', the interposer 84 is presented in the path of an end 88 of an actuator 89. The other end 90 of the actuator 89 serves as a follower which engages the outer surface of the hub end 40' of the pawl 42. A spiral spring 91 urges the end 90 into constant contact with the outer surface of the hub end 40'. While the interposer 84 is presented in the path of end 88 the hub end 40' moves in an orbital path, thereby driving the actuator 89 counterclockwise (FIG. 3). The end 88 exerts a driving force on the interposer 84 which in turn exerts a driving force on the member 83 secured to an end portion 92 of an arm 93. The arm 93 is secured to a tubular control or pivot shaft 94 which is received about the drive shaft 25. Another arm 95 is secured to the other end of the control shaft 94. The guide or control member 82 is secured to the arm 95. During switching, the arm 93 is driven counterclockwise FIG. 3 by the action of the interposer 84, and the arm 95 is driven clockwise FIG. 2; thus, the member 82 moves from engagement in recess 96 of detent member 97 to engagement in recess 98 in detent member 97. Now the member 83 enables the drive end 45 of the pawl 42 to be in driving engagement with the ratchet wheel 46, and the member 82 holds the drive end 43 of the pawl 41 out of driving engagement with the ratchet wheel 44. A tension spring 99 acting on the detent member 97 causes the member 97 to exert sufficient force on the member 82 to hold arms 93 and 95 and the control shaft 94 in the positions into which they were switched. The drive end 45 of the pawl 42 moves in an orbital path in driving engagement with the ratchet wheel 46, while the drive end 43 of the pawl 41 moves in an orbital path out of engagement with the ratchet wheel 44.

As the ribbon R is wound onto the ribbon carrier 52 from the ribbon carrier 51, the movement of the eyelet 62 allows the pivoting of the sensing lever 58 clockwise (FIG. 1) under the influence of the spring 58'. The lateral extension 86 on depending portion 85 engages a notch 86' in the interposer 84 and returns the interposer 84 to the position indicated by the solid lines (FIG. 3). The ribbon R is now wound onto the ribbon carrier 52 from the ribbon carrier 51 until the eyelet 61 drives the sensing lever 57 clockwise (FIG. 1) against the force of the spring 57'; with the sensing lever 57 pivoted clockwise, interposer 100 is urged to the position indicated by phantom lines 100'. A lateral extension 101 is joined to a depending portion 102 of the sensing lever 57. A tension spring 103 connects the lateral extension 101 and the interposer 100. The spring 103 provides a yieldable connection between the lateral extension 101 and the interposer 100. While the interposer 100 is in the path of end 104 of an actuator 105, and as the outer surface of the hub end 39' drives an end 106 of the actuator 105 counterclockwise (FIGURE 2), the end 104 drives the interposer 100 which in turn exerts driving force against the member 82; the member 82 is joined to the arm 95 having an extension 107, and hence the arm 95 is pivoted counterclockwise (FIG. 2), thereby moving the member 82 from its engagement in recess 98 to engagement in the recess 96 of the detent member 97. As the pawl 41 drives the ratchet wheel 44, the ribbon R is wound onto the ribbon carrier 51 so that the movement of the eyelet 61 allows the sensing lever 57 to rotate counterclockwise (FIG. 1). The lateral extension 101 on depending portion 102 engages a notch 101' on the interposer 100 and returns the interposer 100 to the position indicated by the solid lines (FIG. 2).

A tension spring 108 connecting the pawl 41 and the bracket 53 keeps the pawl 41 in constant engagement with the member 82. A spring 109 connecting the pawl 42 and the bracket 54 keeps the pawl 42 in constant contact with the member 83. The interposer 84 is guided for reciprocal movement by rollers 110 and 111 and by guide surface 112 of the bracket 54. The roller 111 is spring-urged to enable the end 88 of the actuator 89 to move the interposer 84 laterally. The interposer 100 is guided for reciprocal movement by rollers 113 and 114 and by a guide surface 115 of the bracket 53. The roller 114 is spring-urged in the same manner as the roller 111 and for the purpose of enabling the interposer 100 to move laterally.

With reference to FIG. 8, it is apparent that when the pawl 41 is in driving engagement with the ratchet wheel 44, a detent pawl 116 is urged into detenting relationship with the ratchet wheel 44 by a tension spring 117. The detent pawl 116 is pivotally mounted by the bracket 53. Conversely, a reduced end 118 at the end of member 83 engages a pin 118' and holds detent pawl 119 out of engagement with the ratchet wheel 46 against the force exerted by the tension spring 120. When the control shaft 94 and arms 93 and 95 are switched from the position shown in the drawing to the opposite position in which the pawl 42 is in driving engagement with the ratchet wheel 46 and the pawl 41 is out of driving engagement with the ratchet wheel 44, the detent pawl 119 is moved into detenting relationship with the ratchet wheel 46 by the spring 120. Conversely, extension 121 at the end of control member 82 engages a pin 122 secured to the pawl 116 and pivots the pawls 41 and 116 out of contact with the ratchet wheel 44 against the force of the spring 117.

A reversing control device is formed by actuators 89 and 105, interposers 84 and 100, members 83 and 82, arms 93 and 95 and shaft 94.

The eccentric connection formed by the eccentric 37 and hub 39' of the pawl 41, causes orbital motion to be imparted to the outer surface of the hub 39', thereby causing the actuator 105 to pivot about pin 105' by camming action. Drive end 43 of the pawl 41 also makes orbital motion. The eccentric connection formed by the eccentric 38 and hub 40' of the pawl 42 causes orbital motion to be imparted to the outer surface of the hub 40', thereby causing the actuator 89 to pivot about pin 89' by camming action. Drive end 45 of the pawl 42 also makes orbital motion.

The clutch 26 serves to prevents damage to the assembly 10 in case of a jam-up. A jam-up could occur if someone attempted to manually pivot both sensing levers 57 and 58 at the same time, thereby driving interposers 100 and 84 in to the paths of respective actuators 105 and 89.

The yieldable connection provided by the spring 103 between extension 101 of the sensing lever 57 and the interposer 100 enables the sensing lever 57 to pivot even though face 104' of the drive end 104 of the actuator 105 happens to

be in the path of movement of the interposer **100**. The yieldable connection provided by the spring **87** between extension **86** of the sensing lever **58** and the interposer **84** enables the sensing lever **58** to pivot en even though face **88'** of the drive end **88** of the actuator **89** happens to be in the path of movement of the interposer **84**.

With reference to FIGS. **7** and **9**, there is shown a U-shaped portion **123** of the bracket **53**. The U-shaped portion **123** has a bearing **124** which journals the shaft **25**. A keeper **125** is secured to the U-shaped portion **123** by a screw **126** (FIGURE **9**). The control shaft **94** can pivot relative to the keeper **125**. A split ring **127** received by the shaft **25** limits the relative lengthwise movement of the shaft **25** with respect to the shaft **94**. A guide **128** prevents the pulley **41** from shifting off the eccentric **37**.

Other embodiments and modifications of this invention will suggest themselves to those skilled in the art, and all such of these as come within the spirit of this invention are included within its scope as best defined by the appended claims.

What is claimed and desired to be secured by Letters Patent of the United States is:

1. For an ink-ribbon feeding and reversing assembly: a first ribbon carrier, a first ratchet wheel for driving said first ribbon carrier, a first drive pawl for driving said first ratchet wheel, a second ribbon carrier, a second ratchet wheel for driving said second ribbon carrier, and a second drive pawl for driving said second ratchet wheel; a reversing control device for effecting reversal of the direction of feed of the ribbon, said reversing control device including means for alternately switching one of said drive pawls into driving engagement with its respective ratchet wheel and the other of said drive pawls out of driving engagement with its respective ratchet wheel, a first actuator movable in a path, a first interposer movable from an inactive position to an active position into the path of said first actuator, a second actuator movable in a path, a second interposer movable from an inactive position to an active position into the path of said second actuator, means operative when the ribbon has been substantially fully wound onto one of said ribbon carriers for moving said first interposer into the path of said first actuator, and means operative when the ribbon has been substantially fully wound onto the other of said ribbon carriers for moving said second interposer into the path of said second actuator, said first actuator being operable to drive said first interposer when said first interposer is in its active position to switch said switching means, said second actuator being operable to drive said second interposer when said second interposer is in its active position to switch said switching means, and driving means for continuously driving said first and second drive pawls and said first and second actuators.

2. The invention as defined in claim **1**, wherein said driving means includes a continuously rotatable shaft, an eccentric connection between each of said first and second drive pawls and said continuously rotatable shaft, said eccentric connections imparting orbital movement to each of said first and second drive pawls, said first and second drive pawls being in driving engagement with their respective first and second actuators.

3. The invention as defined in claim **1**, wherein said driving means includes a continuously rotatable shaft and cam means driven by said continuously rotatable shaft for driving said first and second drive pawls and said first and second actuators.

4. The invention as defined in claim **1**, wherein said switching means includes a pivotal tubular control shaft, and said driving means including a drive shaft received by said tubular control shaft, and means for continuously driving said drive shaft.

5. The invention as defined in claim **1**, including a first drive spindle connecting said first ratchet wheel and said first ribbon carrier, a second drive spindle connecting said second ratchet wheel and said second ribbon carrier, a first sensing lever pivotally mounted by said first drive spindle, an eyelet secured to one marginal end of the ribbon being engageable with said first sensing lever to cause said first sensing lever to drive said first interposer to its active position in the path of said first actuator, and a second sensing lever pivotally mounted by said second drive spindle, an eyelet secured to the other marginal end of the ribbon being engageable with said second sensing lever to cause said second sensing lever to drive said second interposer to its active position in the path of said second actuator.

6. The invention as defined in claim **1**, wherein said switching means includes a pivot shaft, a detent for holding said pivot shaft in either one of two pivoted positions, first and second detent pawls engageable respectively with said first and second ratchet wheels, said first actuator being operable together with said first interposer to pivot said pivot shaft to effect disengagement of said first drive and detent pawls from said first ratchet wheel and to effect engagement of said second drive and detent pawls with said second ratchet wheel, and said second actuator being operable together with said second interposer to pivot said pivot shaft to effect disengagement of said second drive and detent pawls from said second ratchet wheel and to effect engagement of said first drive and detent pawls with said first ratchet wheel.

7. The invention as defined in claim **1**, including a first sensing lever operated by an eyelet secured to one marginal end of the ribbon for moving said first interposer to its active position, a yieldable connection between said first sensing lever and said first interposer, a second sensing lever operated by another eyelet secured to the other marginal end of the ribbon for moving said second interposer to its active position, and a yieldable connection between said second sensing lever and said second interposer.

8. The invention as defined in claim **1**, said driving means including a clutch for limiting the amount of torque which can be applied to said first and second drive pawls and said first and second actuators.

9. For an ink-ribbon feeding and reversing assembly: a first ribbon carrier, a first ratchet wheel for driving said first ribbon carrier, a first drive pawl engageable with said first ratchet wheel, a second ribbon carrier, a second ratchet wheel for driving said second ribbon carrier, a second drive pawl engageable with said second ratchet wheel, a drive shaft, cam means drivingly connecting said drive shaft directly to said first and second drive pawls, switching means for alternately and selectively enabling one of said drive pawls to be in driving engagement with its respective ratchet wheel, said switching means including interposer means controlled by said ribbon, and actuator means driven directly by said cam means for driving said interposer means which in turn switches said switching means.

10. The invention defined in claim **9**, said actuator means having a path of movement, means for reciprocably mounting said interposer means between an inactive position out of the path of movement of said actuator means and an active position in the path of movement of said actuator means, and means for holding said switching means in its switched position until switched by said interposer means.

11. The invention as defined in claim **9**, wherein said cam means includes an eccentric connection between each of said first and second drive pawls and said drive shaft, said eccentric connections imparting orbital movement to each of said first and second drive pawls, said interposer means including an interposer driven directly by its respective actuator means.

12. The invention as defined in claim **9**, including clutch means for limiting the amount of torque which can be applied to said drive shaft.

13. For an ink-ribbon feeding and reversing assembly: a first ribbon carrier, a first ratchet wheel for driving said first ribbon carrier, a first drive pawl engageable with said first ratchet wheel, a second ribbon carrier, a second ratchet wheel for driving said second ribbon carrier, a second drive pawl engageable with said second ratchet wheel, means for driving said first and second drive pawls including means for driving at least one of said drive pawls in an orbital path, a reversing con-

trol device for effecting reversal of the direction of feed of the ribbon, said reversing control device including switchable control means engageable with said first and second drive pawls, an interposer for switching said switchable control means, and an actuator driven by said one drive pawl which moves in said orbital path, and means operable by the ribbon when the ribbon is substantially fully wound on one of said ribbon carriers for moving said interposer to an active position in the path of said actuator to effect driving of said interposer to operate said switchable control means.

14. The invention as defined in claim **13**, wherein said switchable control means includes a tubular control shaft movable between first and second positions, and said means for driving said first and second drive pawls including a drive shaft received by said tubular control shaft.

15. For an ink-ribbon feeding and reversing assembly: a first ribbon carrier, a first ratchet wheel for driving said first ribbon carrier, a first drive pawl having a drive end for driving said first ratchet wheel, a second ribbon carrier, a second ratchet wheel for driving said second ribbon carrier, a second drive pawl having a drive end for driving said second ratchet wheel, a drive shaft, first and second eccentric connections connecting said drive shaft directly respectively to said first and second drive pawls, and first and second guide means engaging respectively said first and second drive pawls, whereby said drive ends of said first and second drive pawls make orbital movements; and means, including said first and second guide means, for controlling the reversal of direction of ribbon feed between said first and second ribbon carriers.

16. The invention as defined in claim **15**, including means for continuously driving said drive shaft.

17. The invention as defined in claim **15**, further comprising means for driving said drive shaft including a motor and a clutch for limiting the torque which can be applied to said drive shaft.

18. An ink-ribbon feeding and reversing assembly comprising:

a first ratchet wheel,

a first ribbon carrier connected to and driven by said first ratchet wheel,

a second ratchet wheel,

a second ribbon carrier connected to and driven by said second ratchet wheel,

a rotatable drive shaft,

a tubular control shaft partially encompassing said drive shaft and having first and second control positions,

a first drive pawl engaging and driving said first ratchet wheel whenever said control shaft is in said first position,

a second drive pawl engaging and driving said second ratchet wheel whenever said control shaft is in said second position,

a first actuator means driven by said drive shaft and operable to place said control shaft in said first position,

a second actuator means driven by said drive shaft and operable to place said control shaft in said second position,

first switching means controlled by said ribbon to render said first actuator means effective to place said control shaft in said first position,

and second switching means controlled by said ribbon to render said second actuator means effective to place said control shaft in said second position.

19. The invention as defined in claim **18** wherein said first switching means includes a first interposer means having a first active and inactive position, said first actuator means driving said first interposer means whenever said first interposer means is in said active position, and said second switching means includes a second interposer means having a second active and inactive position, said second actuator means driving said second interposer means whenever said second interposer means is in said second active position.