April 23, 1929. J. S. DUNCAN ET AL 1,710,088

INK RIBBON MECHANISM

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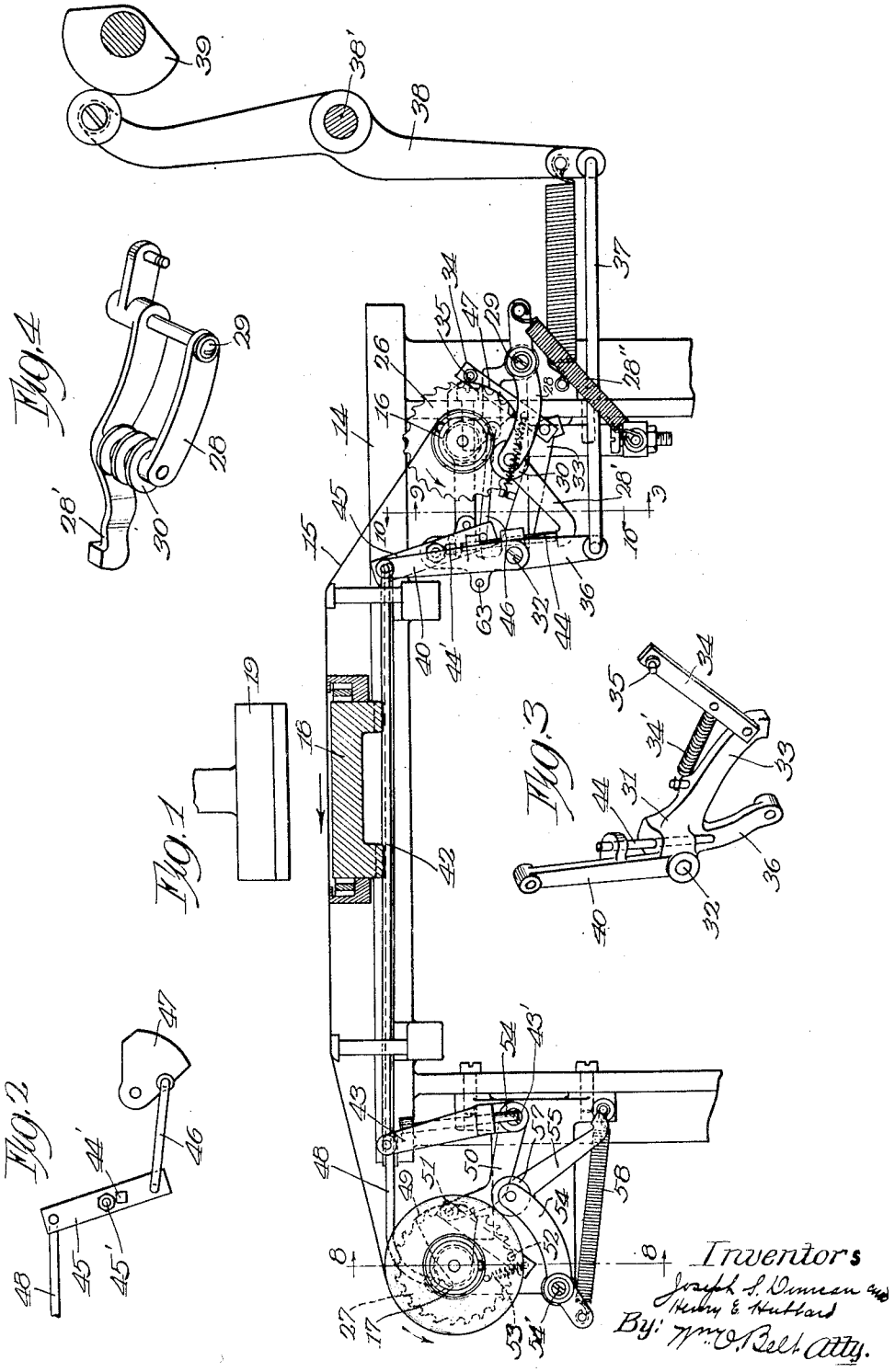


Fig. 4

Fig. 1

Fig. 3

Fig. 2

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INK RIBBON MECHANISM

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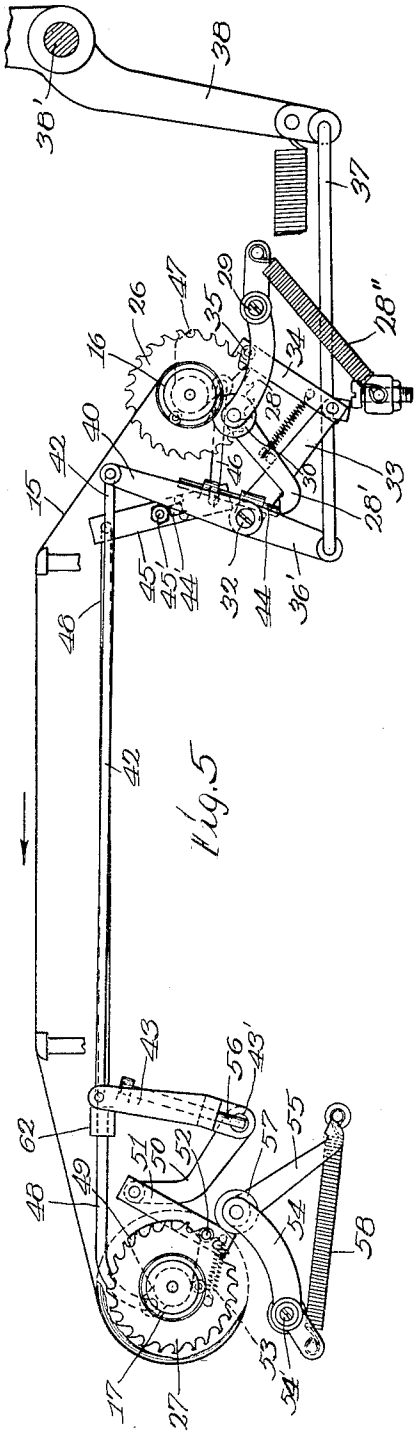


Fig. 5

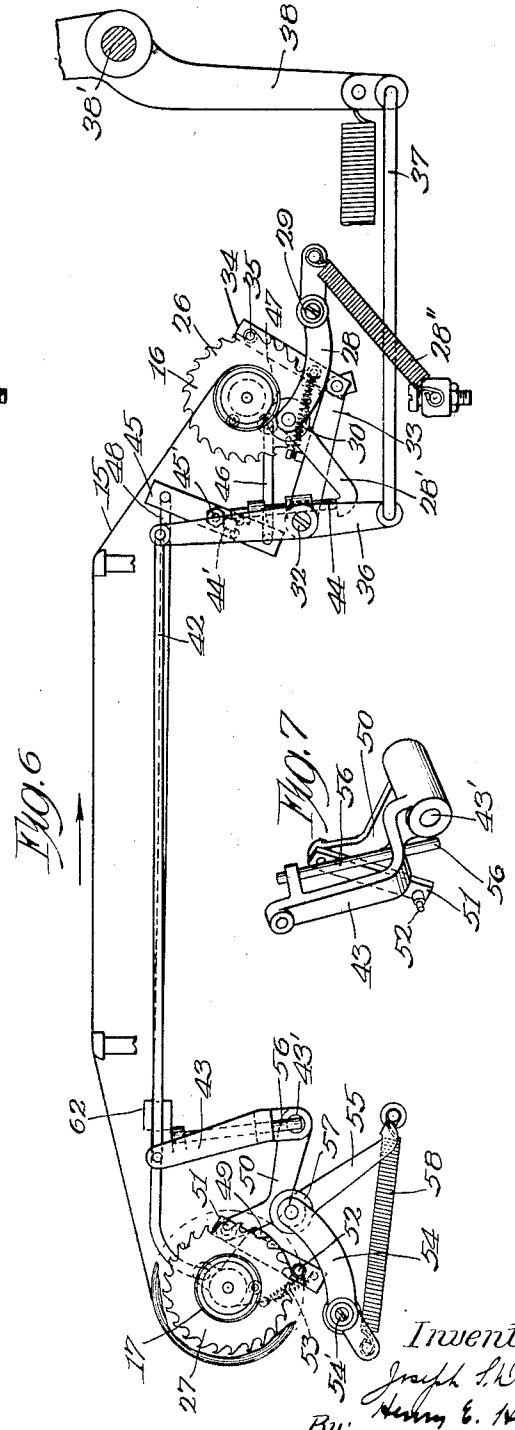


Fig. 6

Fig. 7

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Fig. 8

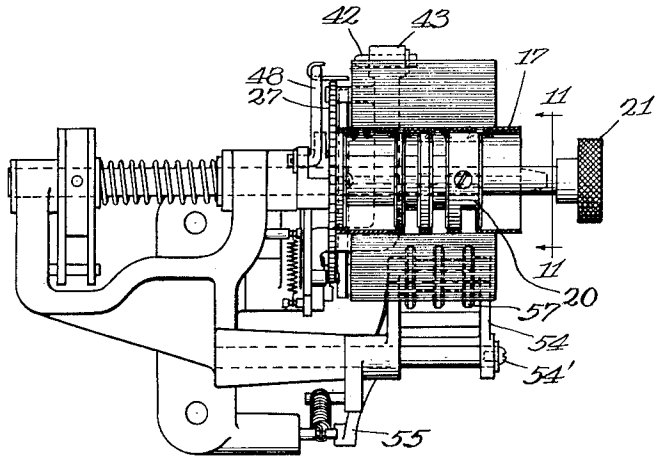


Fig. 9

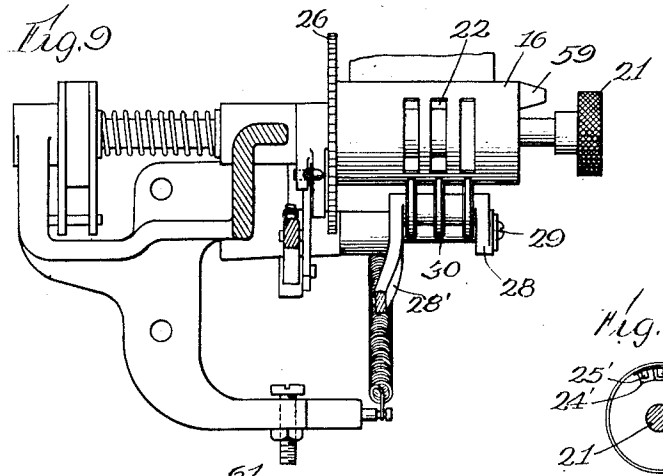


Fig. 10

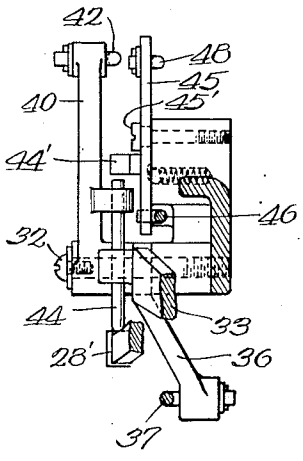
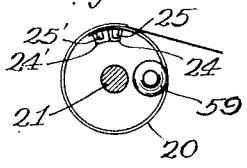


Fig. 11



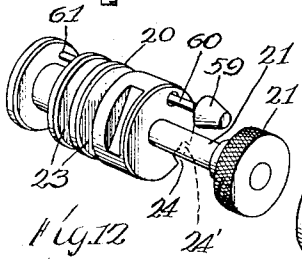
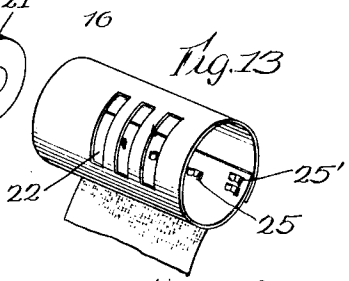


Fig. 12

Fig. 13



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UNITED STATES PATENT OFFICE.

JOSEPH S. DUNCAN AND HENRY E. HUBBARD, OF CHICAGO, ILLINOIS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO ADDRESSOGRAPH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

INK-RIBBON MECHANISM.

Application filed August 26, 1925. Serial No. 52,504.

The object of this invention is to provide a mechanism of simple construction for feeding an ink ribbon step by step from one spool to another and automatically reversing the feed when the ribbon has been fed entirely from one spool and continuing automatically to reverse the feed from one spool to the other during a continuous operation of the machine.

A further object of the invention is to provide a ribbon spool and a tripping mechanism for cooperating therewith, these parts being of a special construction, whereby a spool of a special construction may be used to cooperate with the tripper for automatically reversing the feed of the ink ribbon.

The invention has other objects in view which will appear hereinafter in the detail description of the selected embodiment illustrated in the accompanying drawings, in which

Fig. 1 is a sectional elevation illustrating the improved feeding mechanism.

Figs. 2, 3 and 4 are detail views.

Figs. 5 and 6 show different positions of the feeding mechanism.

Fig. 7 is a detail view.

Fig. 8 is a sectional view on the line 8—8 of Fig. 1.

Fig. 9 is a sectional view on the line 9—9 of Fig. 1.

Fig. 10 is a sectional view on the line 10—10 of Fig. 1.

Figs. 11, 12, and 13 are detail views of the spool and driver.

Referring to the drawings, 14 represents the frame of a printing machine, which may be of a type generally employed for printing addresses on envelopes and the like. An ink ribbon 15 has its ends connected to spools 16, 17 and travels back and forth across a bed 18 and a platen 19 when in printing position. The spools 16, 17 are made alike and each is mounted on a driver 20, fast to a shaft 21, and provided with a knob 21′ (Fig. 12). The spool has one or more slots 22 in its side to register with slots 23 in the driver, and the latter also has a longitudinal groove 24 to receive the row of projections 25 on the inside of the spool which constitute a driving element engaging the driver so that the latter may revolve the spool. The drivers are mounted in the frame 14 on opposite sides of printing position, and in parallel relation, and rigid with the drivers are ratchet wheels 26, 27.

Referring now to the right of Fig. 1, a lever 28 is pivotally mounted at 29 upon the frame 14, and this lever carries between its ends one or more rollers 30 to engage the slots 22 of the spool and grooves 23 of the driver. The lever 28 is normally held by a spring 28″ with the rollers 30 in engagement with the ribbon on the spool or with the spool. A lever 31 (Fig. 3) is pivotally mounted at 32 on the frame 14 and it has an arm 33 which carries a pivoted link 34, having a pin 35 to engage the teeth of the ratchet wheel 26 for turning the driver and spool intermittently. A spring 34′ engaging the link and the arm 33 normally holds the pin 35 in operative engagement with the ratchet teeth. An arm 36 on the lever 31 is connected by a link 37 with a spring pressed lever 38 pivoted at 38′ on the frame of the machine and actuated by a cam 39. In the operation of the machine, the cam operates continuously, rocking the lever 38 and imparting a rocking movement to the lever 31. Another arm 40 on the lever 31 projects upward and is connected by a rod 42 with a lever 43 pivoted at 43′ on the frame 14. A pin 44 is slidably mounted in the lever 31 and is arranged to be engaged by the forward end 28′ of the lever 28, to be thrust upward by said lever 28 into the path of a projection 44′ on a lever 45, Fig. 2, which is pivoted at 45′ on the frame 14 and is connected at its lower end by a link 46 with a cam 47 loosely mounted on the shaft of the driver for the spool 16. The upper end of this lever 45 is connected by a rod 48 with a cam 49 loosely mounted on the shaft of the driver for spool 17. The two cams 47 and 49 are arranged to project beyond the working edge of the teeth of the sprockets to clear the pin 35 from the teeth of sprocket 26 and to clear a corresponding pin from the teeth of sprocket 27, the cams being positioned on their respective shafts so that they will be thrust in operative position alternately.

An arm 50 on the lever 43, at the left of Fig. 1, carries a pivoted link 51 which is provided with a pin 52 to engage the teeth of the ratchet 27, being held by a spring 53 normally in operative engagement with the ratchet. A lever 54 is pivoted at 54′, on the frame 14 and has an arm 55 which is arranged to engage a

pin 56, Fig. 7, on the lever 43. This lever 54 also carries one or more rollers 57, which are held by a spring 58, in operative engagement with the ribbon on the spool 17 or with the spool.

In practice the spool 16 or 17 is thrust over the knob 21′ on to the driver 20. The row of projections 25 must be registered with the groove 24 so that the spool can be arranged in proper position on the driver with the slots 22 registering with the grooves 23. To prevent the spool from being put on the driver wrong end to I provide the spool with an extra projection 25′ which is arranged to engage a recess 24′ in the driver, but this projection is spaced from the projections 25 so far that it cannot enter the groove 24 and hence it is only possible to arrange the spool on its driver in its proper position. A catch 59, (Fig. 12) is carried by a stem 60 which projects through an enlarged opening in the spool and is fastened to the spool at 61. This catch is cone shaped and the stem will yield to permit the arrangement of the spool on the driver, after which the catch will engage the end of the spool, as shown in Fig. 9, to hold the spool in place on the driver. The lever 38 operates continuously during the operation of the machine and hence actuates the rod 42 and the parts connected therewith including the links 34 and 51 carrying the pins 35 and 52, the links and pins constituting feed pawls, which are arranged for operative engagement with the teeth of the ratchet wheels. In Fig. 1 the ribbon is traveling from right to left and the cam 47 is arranged to be engaged by the pin 35 to clear the pin from the teeth of ratchet 26 so that this spool will idle. The rollers 30 are yieldingly held against the ribbon on the spool and act as a retarder to prevent loose unwinding of the ribbon. During this operation while the spool 16 is idling, and acting as a supply spool, the spool 17 is receiving the ribbon and acting as a take-up spool. The cam 49 is held out of the way of the pin 52 so that this pin engages the teeth of the ratchet 27 and causes the spool 17 to take up the ribbon and feed it forward from the spool 16. When all the ribbon is fed off of the spool 16 the rollers 30 will enter the slots 22 of the spool 16 and the grooves 23 of the driver, being urged thereinto by the spring 28′ acting on the lever 28. As this lever is thus rocked the arm 28′ will lift the pin 44 into the path of movement of the projection 44′ on the lever 45 so that on the next movement of the lever 31 the pin 44 will engage the projection 44′ and rock the lever 45 to shift the cams 47 and 49 from the position shown in Fig. 1, where the ribbon is feeding from right to left to the position shown in Fig. 6, where the ribbon is feeding from left to right. Fig. 5 shows the intermediate position where the ribbon has been fed off of the spool 16 and the tripper rollers have entered the slots in the spool and the pin 44 has been lifted so that it will engage the projection 44′ on the next operation of the lever 31 and shift the lever 45 and the cams connected therewith to the position shown in Fig. 6. When the ribbon has been fed from the spool 17 to spool 16, the lever 54 will be operated to thrust the pin 56 upward, where it will engage the block 62 on the rod 48 and shift the cams to effect reversal of the feed. A stop 63 is provided on the frame to be engaged by the lever 45 for limiting the movement of the cam controlling means. Thus the ratchet pawls are continuously operating, but only the one engages the ratchet where the cam is in inoperative position and the other pawl is prevented from engaging its ratchet by the cam being in operative position, where the pawl rides over the edge of the cam and is held thereby away from the ratchet teeth. When the ribbon is exhausted from one spool, the rollers enter the slots in the spool and the grooves in the driver and immediately there is a reversal of the feed of the ribbon because, as before stated, the lever 38 is constantly operating during the operation of the machine and, consequently, the lever 31 carrying the pawl 34, 35, and the lever 43 carrying the pawl 51, 52 are also constantly operated, but the cams 47 and 49 control the pawls in their operation of the ratchets. It will be noted that the lever 31 and the lever 43 act as bell crank levers, and that the lever 28 and the lever 54 are spring controlled and with the rollers and the arms 28′, 55 constitute trippers for effecting the reversal of feed of the ribbon.

We have illustrated the invention in a form which we have found commercially practicable and satisfactory, but we realize that changes in the form and proportion of parts and details of construction may be made without departing from the spirit or sacrificing the advantages of the invention, and we reserve the right to make all such changes as fairly fall within the scope of the following claims.

We claim:

1. Ink ribbon mechanism comprising a rotatable driver having a circumferential groove, a hollow ribbon spool removably embracing the driver in driving engagement therewith and having a circumferential slot registered with the groove of the driver, and tripping mechanism including an anti-friction roller mounted to engage the periphery of a rolled ribbon wound upon the spool and also disposed to enter the slot and groove when the ribbon has been unwound from the spool, a pawl for rotating said spool, and a cam for preventing the pawl from operating the ratchet when said roller enters the slot and groove.

2. Ink ribbon mechanism comprising a rotatable driver having a circumferential

groove, a hollow ribbon spool in the form of a thin open ended cylindrical shell removably embracing the driver in driving engagement therewith and having a circumferential slot registered with the groove of the driver, and tripping mechanism including an anti-friction roller mounted to engage the periphery of a rolled ribbon wound upon the spool and also disposed to enter the slot and groove when the ribbon has been unwound from the spool, a pawl for rotating said spool, and a cam for preventing the pawl from operating the ratchet when said roller enters the slot and groove.

3. Ink ribbon mechanism comprising a pair of slotted spools, an ink ribbon connected at its ends to the spools, means for feeding the ribbon from one spool to the other and comprising a constantly operating feed pawl and a ratchet mechanism for each spool, and means for reversing the feed of the ribbon comprising cams, and means for operating the cams to prevent cooperation of the pawl and ratchet of one spool while the pawl and ratchet of the other spool are cooperative, a pair of trippers for actuating said reversing means, each tripper being mounted to enter the slot of its adjacent spool when the ribbon has been unwound therefrom to thereby control the reversing means, and to prevent cooperation of one of said pawls with its cooperating ratchet when the tripper has entered said slot.

4. Ink ribbon mechanism comprising a pair of spools, an ink ribbon connected at its ends to the spools, pawl and ratchet mechanism for each spool, levers connected to said pawls and to each other for conjoint operation, means for rendering one pawl inoperative while the other pawl is operative, a tripper for each spool adapted to be operated when the ribbon is unwound from the spool, a pin for each tripper adapted to be operated thereby, and a device adapted to engage said pins to effect the shift of operation of the pawl controlling means.

5. Ink ribbon mechanism comprising a ribbon spool having a slot therein, a driver adapted to receive said spool and having a groove to register with the slot in the spool, a tripper adapted to engage the slot and groove, projections on said spool and engaging said driver to insure registration of the slot and groove in the assembled condition of the spool and driver, and displaceable means to detachably retain the spool on the driver.

6. Ink ribbon mechanism comprising a ribbon spool having a slot therein, a driver adapted to receive said spool and having a groove to register with the slot in the spool, a tripper adapted to engage the slot and groove, means to insure registration of the slot and groove in the assembled condition of the spool and driver, and displaceable means to detachably retain the spool on the driver.

7. Ink ribbon mechanism comprising a ribbon spool having a slot therein, a driver adapted to receive said spool and having a groove to register with the slot in the spool, a plurality of spaced projections on the inside of the spool and a longitudinal groove in the driver to make interlocking engagement between the spool and driver, and means including a projection spaced from said other projections and adapted to engage said driver to permit the spool to be arranged in one position only on the driver.

8. Ink ribbon mechanism comprising a ribbon spool having a slot therein, a driver adapted to receive the spool and having a groove to register with the slot in the spool, a longitudinal groove in the driver, a plurality of spaced projections inside the spool to engage said groove for interlocking the spool and driver, and a separate projection in the spool spaced from said other projections and adapted to engage a separate recess in the driver to insure arrangement of the spool on the driver in one position only.

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