A. C. ROEBUCK.

RIBBON REVERSE MECHANISM.

APPLICATION F LED MAR. 23, 1914.

1,166,483.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.

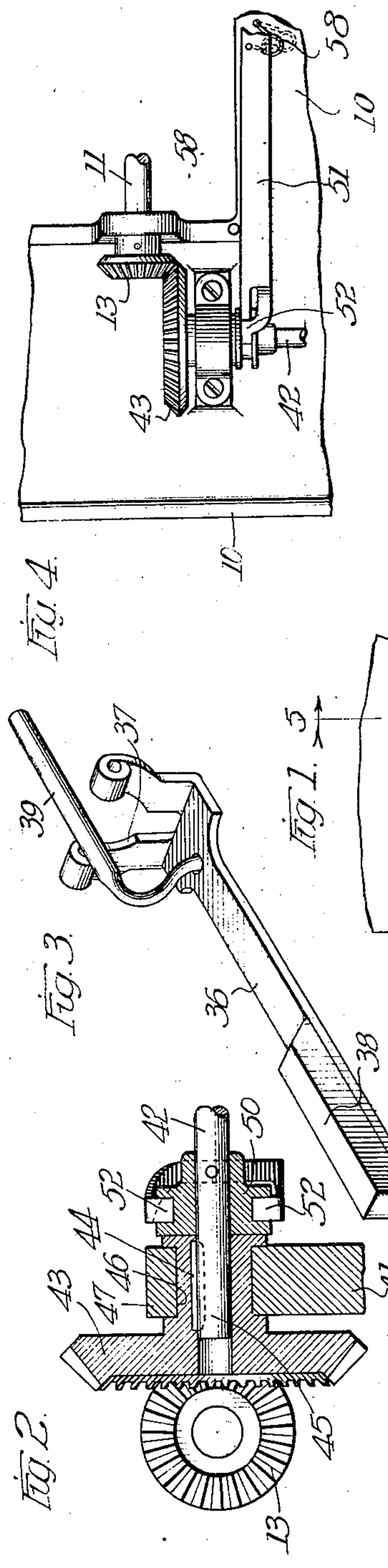

Fig. 4.

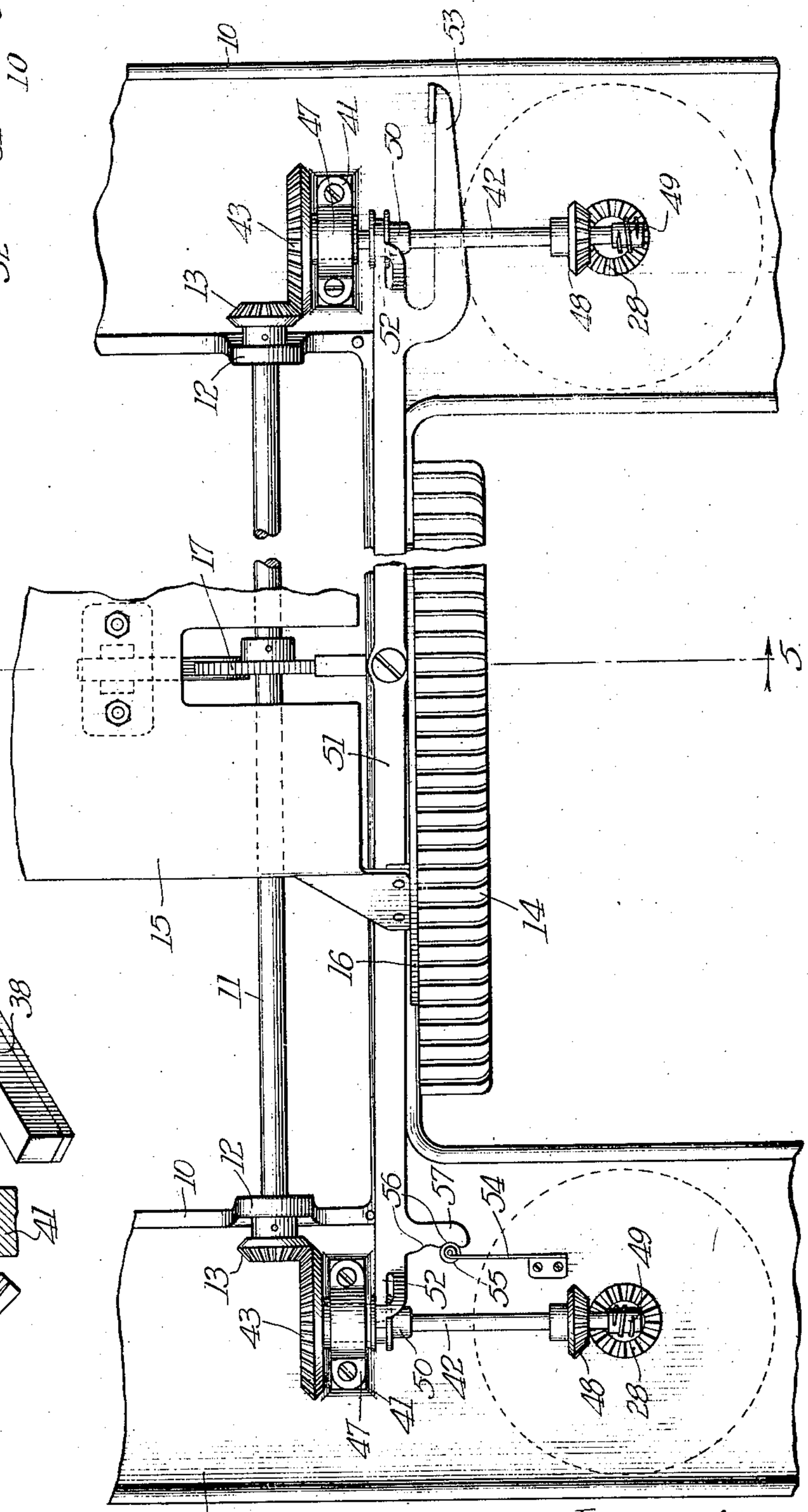

Fig. 1.

Fig. 3.

Fig. 2.

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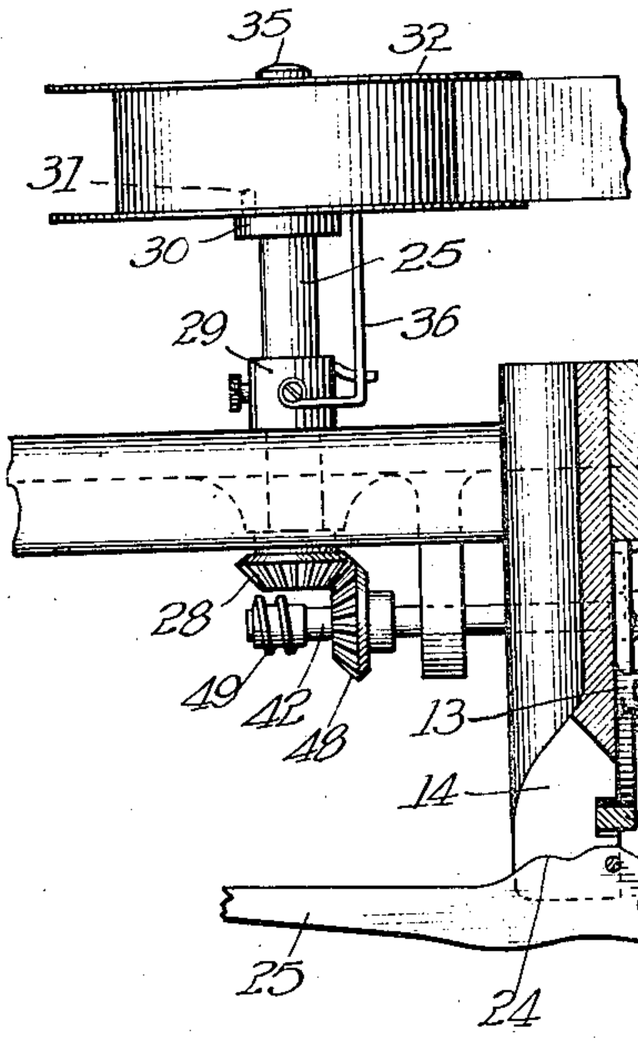


Fig. 5.

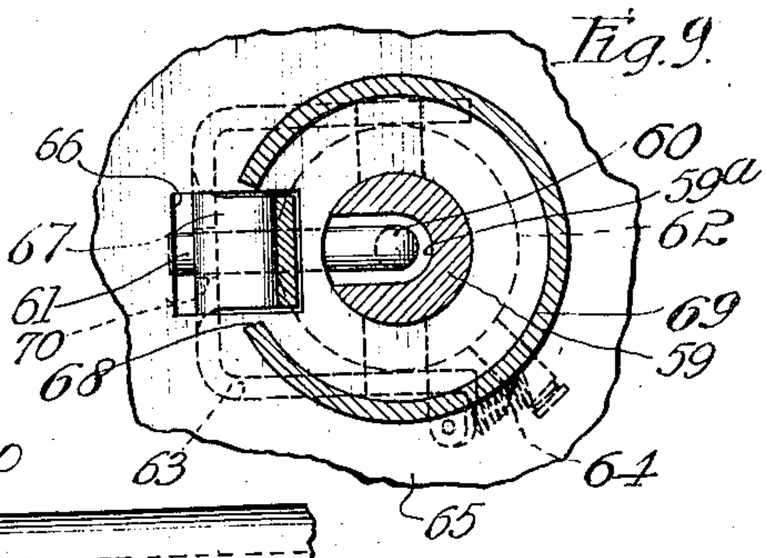


Fig. 9.

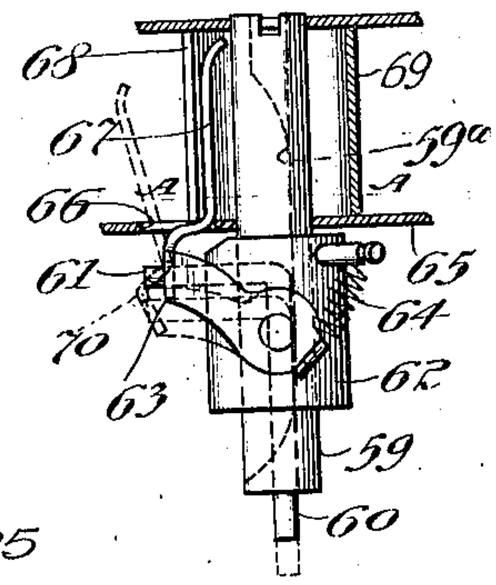


Fig. 8.

Fig. 6.

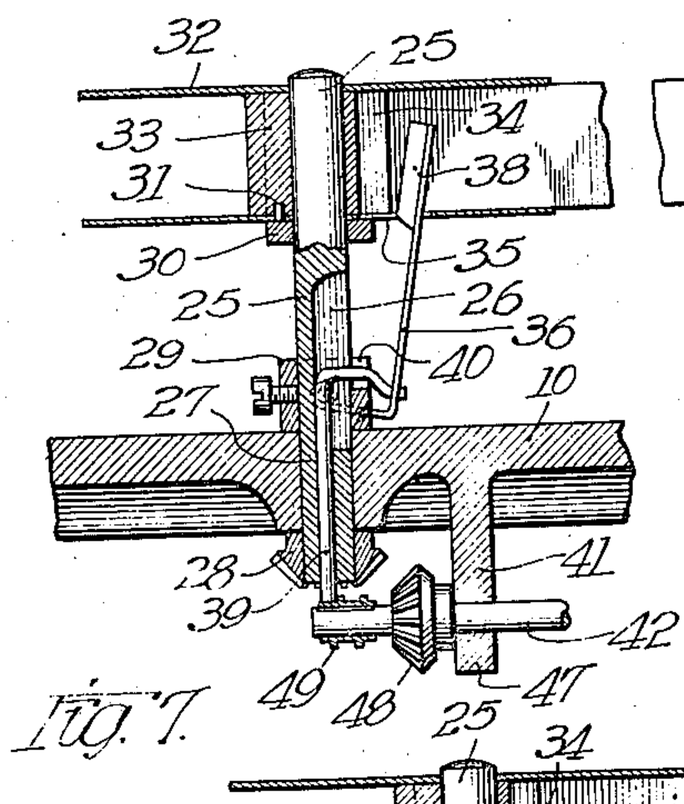
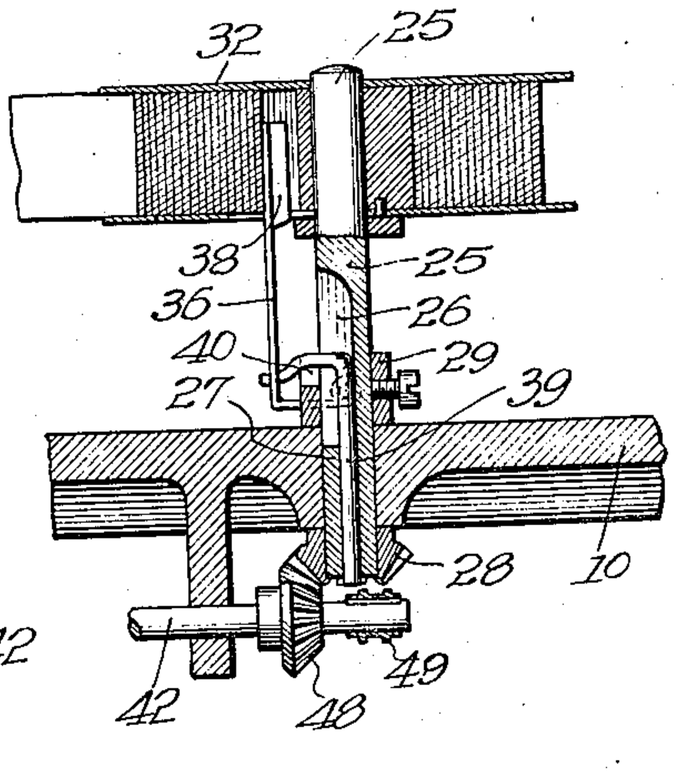


Fig. 7.



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UNITED STATES PATENT OFFICE.

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RIBBON-REVERSE MECHANISM.

1,166,483. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed March 23, 1914. Serial No. 826,571.

To all whom it may concern:

Be it known that I, ALVAH C. ROEBUCK, a citizen of the United States, residing at Woodstock, in the county of McHenry and State of Illinois, have invented certain new and useful Improvements in Ribbon-Reverse Mechanism, of which the following is a specification.

This invention relates to ribbon reverse mechanism, and more particularly to automatic mechanism of this class which has for its principal object to provide means for automatically effecting the control of the mechanism which relates to ribbon spools by means of which the typewriter ribbon is unwound from one of the spools and wound upon the other.

A further object of the invention is to provide mechanism of this class in which no strain is brought upon the ribbon itself at the time of making the shift.

A still further object of the invention is to provide improved means for utilizing the ribbon to nearly its full length.

For the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts generally shown in the drawings and described in the specification, but more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a bottom view of a mechanism constructed in accordance with the principles of my invention; Fig. 2 is a detail view of one of the shiftable shafts; Fig. 3 is a perspective view of one of the ribbon reversing parts; Fig. 4 is a view of a modification of the positioning spring; Fig. 5 is a sectional view on the line 5—5 of Fig. 1; Fig. 6 is a detail sectional view of the ribbon spool mechanism at one point of the operation; Fig. 7 is a detail sectional view of one of the ribbon spool mechanisms at another point in the operation; and Figs. 8 and 9 are views of a modified form of tripping mechanism.

It is customary to provide mechanism for reversing the feed of the ribbon at any desired time. The actual reversing operation may be accomplished manually, and means are also provided for automatically causing the action of the ribbon reversing mechanism at or near the end of the ribbon. The present invention relates to a mechanism for automatically reversing the direction of feed of the ribbon in a new and improved manner without placing any strain whatever upon the ribbon at the time of making the shift.

Referring now more particularly to the drawings, the numeral 10 designates generally a frame or top plate of the typewriter to which my mechanism is attached. A shaft 11 extends across the frame, is rotatable in bearing lugs 12 of the frame and is provided with beveled gears 13 at the ends. This shaft 11 is rotated behind a type bar segment 14 and preferably above a universal bar frame 15 which supports a universal bar 16. Mounted on the shaft 11 intermediate its ends is a toothed feed wheel 17 adapted to be engaged by a pawl 18 mounted in a lug 19 projecting from the rear of the type bar segment 14 and pressed in engagement with the feed wheel by means of a spring 20. A feed dog 21 is mounted in the support 22 secured to the frame 15, and a spring 23 is provided to engage the feed dog and to hold it yieldingly in engagement with the feed wheel 17. The universal bar 16 is adapted to be engaged by a heel 24 of any one of the type bars 25^a when they are moved in the type bar segment by the key actuating means. The rearward movement of the universal bar frame 15 causes the rearward movement of the feed dog 21 to engage the next tooth and the forward movement of the universal bar frame causes the feed dog to rotate the feed wheel 17 in accordance therewith.

Mounted in the top plate 10 and extending through the plate are ribbon spool shafts 25 each formed with a slot 26 and a hole 27 extending from the slot through the bottom of the shaft. Mounted at the lower end of each shaft 25 is a beveled gear 28 and adjustably secured to the shaft above the plate 10 is a collar 29 which holds the shaft against movement in either direction. Also mounted on the ribbon spool shaft 25 is a collar 30 with an upwardly projecting pin 31. A ribbon spool 32 is adapted to be placed over the upper end of the shaft 25 and is held in place by the collar 30 and against rotation with respect to the shaft by the engagement of the pin 31 with a corresponding opening in the ribbon spool. The ribbon spool is provided with a hub or core 33 which has a slot 34, and an opening 35 is provided in the side of the ribbon

spool which registers with the slot 34. An actuating lever 36 provided with a forked angular extremity 37 is pivotally mounted at opposite sides on the collar 29 with an upper end extending through the opening 35 of the spool and has a weight 38 which is adapted to enter the groove 34 in the ribbon spool core 33. Loosely attached to the lever 36 adjacent the forked extremity is a rod 39 which extends into the slot 26 of the ribbon spool shaft 25 through the hole 27 and projects slightly beyond the end of the shaft when the lever 36 is in its lowermost position. The collar 29 is preferably formed with a slot 40 in which the upper end of the rod 39 is seated, with the slot serving to hold the rod in proper position and to act as a guide for it. The movement of the lever 36 about its pivotal support causes a corresponding upward and downward movement of the rod 39 raising and lowering the lower end of the rod into its protruding position.

Mounted in a depending lug 41 at each side of the frame 10 is a longitudinally movable shaft 42 having a gear 43 which meshes with one of the gears 13 on the end of the feed shaft 11. The shaft 42 is free to move longitudinally with respect to the gear 43 by means of a key 44 and slot 45. This gear 43 is preferably formed with a reduced portion 46 and is held in mesh with the gear 13 by means of a yoke 47 which secures it to the lug or projection 41. At the other end of each shaft 42 is a beveled gear 48 adapted to mesh with the gear 28 at the bottom of the ribbon spool shaft 25. The end of the shaft 42 extends directly below the ribbon spool shaft 25 and is provided at its end with a threaded worm portion or member 49 which is adapted to engage the protruding tip of the rod 39 which is movable in the ribbon spool shaft. When the ribbon is all unwound from a spool the lever 36 drops, carrying with it the rod 39 which thereupon engages in the threaded member 49 causing the shaft 42 to be moved endwise and bringing the gear 48 in mesh with the gear 28.

Secured to each of the shafts 42 is a grooved clutch collar 50. A lever 51 pivoted adjacent the center of the frame is provided with bifurcated extremities 52 which engage the groove of both of the clutch collars 50 and they are so positioned that when one of the gears 48 meshes with the corresponding gear 28 on the ribbon spool shaft, the other one is free from such engagement, as shown by Figs. 1 and 6. An arm 53 projects from one extremity of the lever 51 to a point adjacent the edge of the top plate 10 and constitutes a means for manually shifting the lever 51 to place either one of the ribbon spool shafts in driving engagement and the other one out of driving engagement. In order to hold the lever 51 yieldingly in either position an arm 54 is attached to the under side of the frame carrying an anti-friction roller 55 which engages in grooves 56 in a projection 57 of the lever 51. Another means for holding the lever in either position is shown by Fig. 4 in which a coil spring 58 is attached at one end to the frame 10 and at the other end to one arm of the lever 51. The connection of this spring is such that the movement of the lever 51 on either side of a central position causes the spring to press the lever yieldingly in that direction.

In operation, the movement of the universal bar frame causes the movement of the feed shaft 11 and of both of the shafts 42, as previously set forth. Only one of the gears 48 meshes with the corresponding gear 28 at the same time. In Fig. 6 the ribbon has been wound upon the right-hand ribbon spool 32 and is all unwound from the left-hand ribbon spool so that the lever 36 is free to drop to the position shown. When it drops to this position the rod 39 is moved downwardly to engage with the toothed member 49 and the continued movement of the universal bar frame and of the feeding shaft 11 causes the rotation of the left-hand shaft 42 in contact with the rod 39. The movement of the threaded member 49 causes the shaft 42 to be drawn endwise, by the engagement of the rod 39 therewith which moves the lever 51 by reason of the engagement of its bifurcated extremity with the clutch collar 50, thereby causing the left-hand gear 48 to be drawn into engagement with the gear 28, as shown by Fig. 7, and the right-hand gear 48 of Fig. 6, to be drawn out of such engagement. When the shift is complete the left-hand ribbon spool will be connected, as shown in Fig. 7, with the extremity of the rod 39 in engagement with the threaded portion 49. As soon, however, as the ribbon begins to wind about the core the upper end of the lever 36 will be engaged by the ribbon and it will be forced into the slot 34, whereupon the rod 39 will be raised out of engagement with the threaded member 49. By this operation the other shaft 42 will be placed in position so that when the ribbon is all unwound from the other spool the reversing mechanism can operate, in the manner just described, to engage and move the other shaft 42 longitudinally and effect the automatic shift or movement of the ribbon.

With this construction it is apparent that there is no tension upon the ribbon at the time of making the shift or at any other time except the tension which is required in moving the ribbon from one spool to the other; only one of the ribbon spool shafts is in mesh with the feeding mechanism at the same time and consequently there is no

tendency of one ribbon spool to pull the ribbon against the other.

Instead of the weighted lever 36, a spring-pressed construction, as shown by Figs. 8 and 9, may be employed. A spool shaft 59 is formed with a recess 59[a] and a hole extending through the bottom of the shaft, in which is disposed a rod 60 with a bent upper end 61. A collar 62 is secured to the shaft 53 and a member 63 with forked ends is pivoted to opposite ends of the collar with a spring 64 connected to it and the collar. A ribbon spool 65 is mounted on the shaft, and has an aperture 66 through which a tongue 67 from the member extends, a slot 68 being formed in ribbon spool core 69 to permit the tongue to swing outwardly under the action of spring 64, the tongue being normally held in the slot by ribbon wound on the spool core 69. The member 63 has a perforation 70 through which the bent end 61 of the rod 60 extends so that the movement of the member 63 about its pivotal support causes its raising and lowering, the spring 64 being substituted for a weighted lever. Other and further changes in the construction of the several parts may be made without departing from the spirit and scope of the invention.

What I claim is:

1. In a typewriter, automatic ribbon reversing mechanism comprising ribbon spool shafts, a longitudinally fixed but rotatable feeding shaft therefor, intermediate longitudinally movable shafts each having one end in fixed driving engagement with the said feeding shaft and the other end provided with a gear movable into and out of driving engagement with the ribbon spool shafts, and means in connection with each ribbon spool shaft for moving the intermediate shafts longitudinally to reverse the driving connection when the ribbon is nearly unwound from one of the ribbon spool shafts.

2. In a typewriter, automatic ribbon reversing mechanism comprising ribbon spool shafts, a longitudinally fixed but rotatable feeding shaft therefor, intermediate longitudinally movable shafts each having one end in fixed driving engagement with the said feeding shaft and the other end provided with a gear movable into and out of driving engagement with the ribbon spool shafts, only one of the ribbon spool shafts being in engagement with the feeding shafts, and means for reversing the connection for rotating the ribbon spool shafts comprising an actuating means in connection with each spool shaft, and a bar pivoted intermediate the longitudinally movable shafts for moving one of the said shafts oppositely to the other.

3. In automatic ribbon reversing mechanism, rotatable ribbon spool shafts, a gear mounted on each shaft, driving mechanism therefor comprising a longitudinally movable shaft, a gear carried thereby adapted to be moved into and out of mesh with the gear on one of the shafts, a threaded member on the movable shaft, a driving shaft with which both movable shafts are rotatably connected, a lever pivoted to the ribbon spool shaft adapted to be engaged by the ribbon when it is wound on the shaft, and a rod connected to the lever and moved by it into and out of engagement with the threaded member on the movable shaft to move the latter and its gear into driving position with respect to its ribbon spool shaft.

4. In automatic ribbon reversing mechanism, rotatable ribbon spool shafts, a gear mounted on each shaft, driving mechanism therefor comprising a longitudinally movable shaft, a gear carried thereby adapted to be moved into and out of mesh with the gear on one of the shafts, a threaded member on the movable shaft, a driving shaft with which both movable shafts are rotatably connected, a lever pivoted to the ribbon spool shaft adapted to be engaged by the ribbon when it is wound on the shaft, a rod connected to the lever and moved by it into and out of engagement with the threaded member and the movable shaft, and a bar connecting the longitudinally movable shafts and pivoted between them whereby the engagement of the rod with one of the threaded members will operate both longitudinally movable shafts to reverse the driving connection.

5. In automatic ribbon reversing mechanism, rotatable ribbon spool shafts, driving means therefor comprising a shaft, parallel longitudinally movable shafts connected for rotation with the driving shaft and movable into and out of driving connection with the ribbon spool shafts, a reciprocable universal bar, means for transmitting the reciprocating movement of the universal bar to rotate the driving shaft, and a reversing bar connected to the movable shafts for holding one but not both of them in driving engagement with the ribbon spool shafts at the same time.

6. In a typewriter, automatic ribbon reversing mechanism comprising a reciprocable universal bar, a rotatable driving shaft fixed against longitudinal movement, means for causing the reciprocation of the universal bar to rotate the driving shaft in one direction, two rotatable ribbon spool shafts, an intermediate movable shaft having a fixed driving connection with the driving shaft and a gear movable into driving connection with the ribbon spool shaft, means in connection with each ribbon spool shaft and its corresponding movable shaft for moving the movable shafts longitudinally when the ribbon on its spool shaft is unwound there-

from, and a reversing bar pivoted between the longitudinally movable shafts for reversing the driving connection between the ribbon spool shafts and the driving shaft in accordance with the ribbon wound on the said ribbon spool shafts.

7. In automatic ribbon reversing mechanism, the combination with a rotatable driving shaft, of longitudinally movable shafts at right angles thereto, driving pinions on the movable shaft, rotatable ribbon spool shafts, gears on the ribbon spool shafts adapted to mesh with the driving pinions, a reversing bar connected to the movable shafts for holding the driving pinion of one of them in engagement with the gear of one of the ribbon spool shafts and out of engagement with the other, and means in connection with each of the spools for moving the corresponding longitudinally movable shaft into engaging position when the ribbon is unwound from the shaft, the reversing bar being adapted to move the other movable shaft out of driving position.

8. In automatic ribbon reversing mechanism, the combination with rotatable ribbon spool shafts, a driving mechanism therefor comprising longitudinally movable shafts, gears on the ribbon spool shafts, driving pinions on the longitudinally movable shafts, a reversing bar connected to the longitudinally movable shafts, and means in connection with each of the ribbon spool shafts and in contact with the ribbon wound upon the shafts to effect the longitudinal movement of one of the movable shafts, and consequently of the other to reverse the driving mechanism when the ribbon is unwound from one of the shafts.

9. In automatic ribbon reversing mechanism, rotatable ribbon spool shafts, driving means therefor comprising parallel longitudinally movable shafts movable into and out of driving connection with the ribbon spool shafts, and a reversing bar connected to the movable shafts for holding one but not both in driving engagement with the ribbon spool shafts at the same time and provided with an arm for manual operation of the reversing bar.

10. In automatic ribbon reversing mechanism, rotatable ribbon spool shafts, driving mechanism therefor comprising rotatable shafts movable longitudinally into and out of engagement with the ribbon spool shaft, a reversing lever connected at the end to the longitudinally movable shafts for holding one of them in and the other out of engagement with the ribbon spool shafts, the reversing lever having a notched portion, and a spring-pressed roller adapted to engage the notches of the projection to hold the reversing lever in its different positions.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of march, A. D. 1914.

ALVAH C. ROEBUCK.

Witnesses:
L. E. HOUSEHOLDER,
J. F. SWALESTEDT.