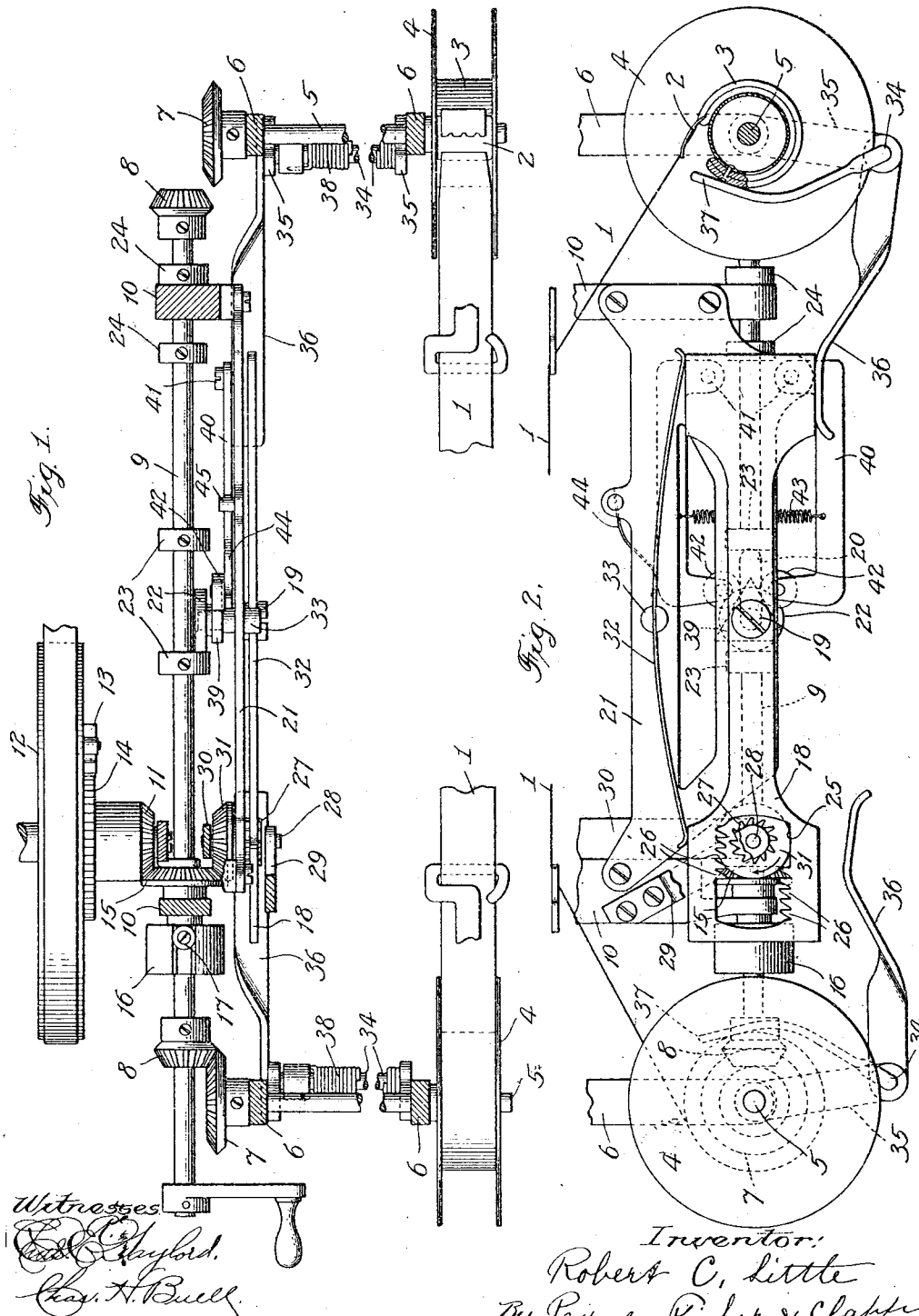


R. C. LITTLE.
 AUTOMATIC RIBBON REVERSING MECHANISM.
 APPLICATION FILED JAN. 2, 1914.

1,114,494.

Patented Oct. 20, 1914.

2 SHEETS—SHEET 1.

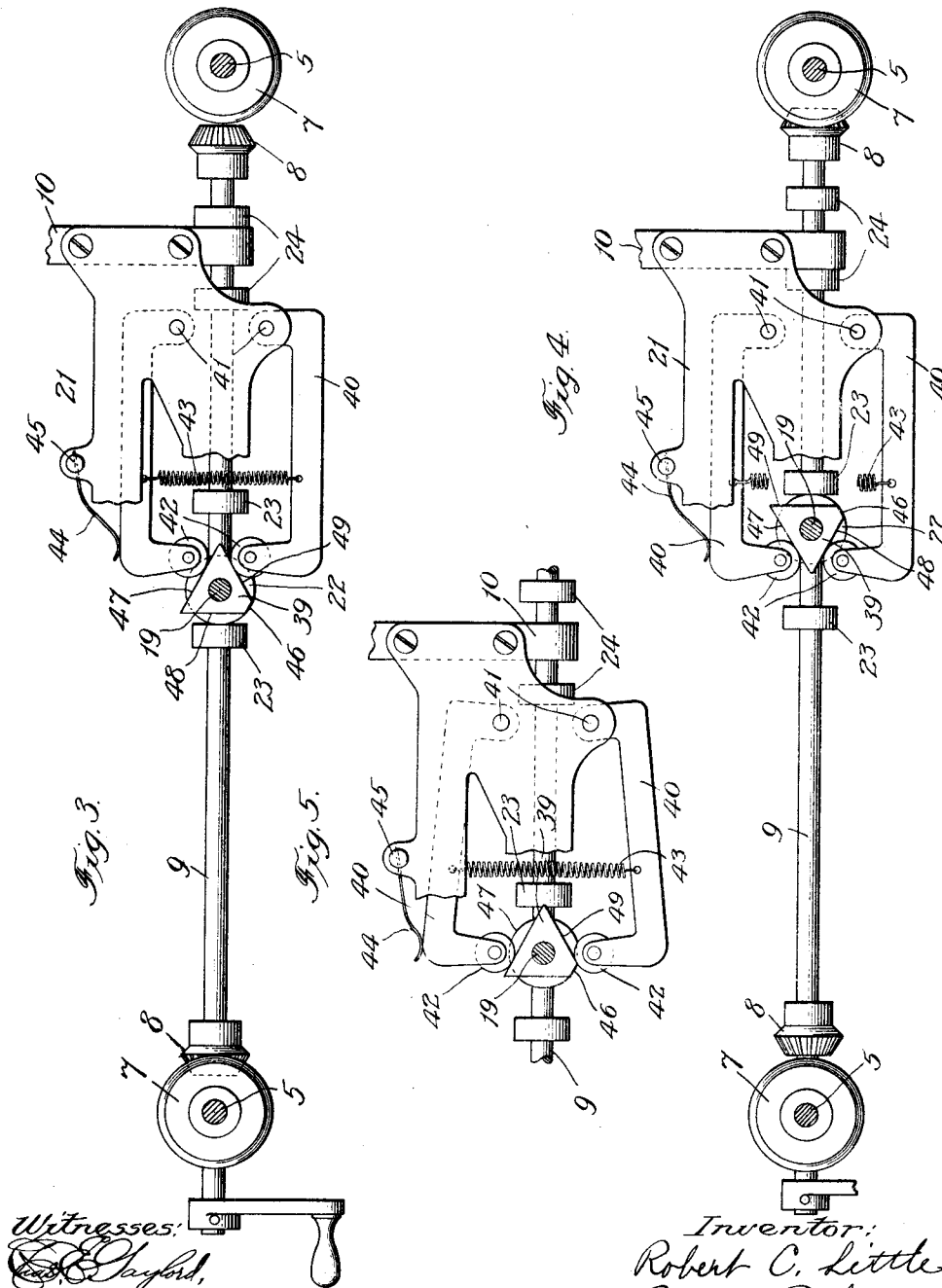


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UNITED STATES PATENT OFFICE.

ROBERT C. LITTLE, OF CHICAGO, ILLINOIS.

AUTOMATIC RIBBON-REVERSING MECHANISM.

1,114,494.

Specification of Letters Patent.

Patented Oct. 20, 1914.

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To all whom it may concern:

Be it known that I, ROBERT C. LITTLE, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Automatic Ribbon-Reversing Mechanism, of which the following is a full, clear, and exact description.

The invention relates to automatic ribbon reversing mechanism for typewriting machines and the like and seeks to provide simple and effective mechanism by which the ribbon drive mechanism may be reversed to thereby change the direction of travel of the ribbon.

Ribbon drive mechanisms are generally provided with a member or coupling device which is shiftable to reverse the drive mechanism or alternately connecting the ribbon spools to the source of power to thereby reverse the direction of travel of the ribbon.

More particularly the present invention seeks to provide improved means whereby the throw of the shiftable member or coupling device is effected quickly and with great certainty.

The invention consists in the features of improvement hereinafter set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view of a ribbon drive mechanism with the present improvement applied thereto. Fig. 2 is a view in front elevation of the part shown in Fig. 1. Fig. 3 is a view in elevation of the shiftable member or coupling device with the improved means for effecting its throw. Fig. 4 is a similar view with the parts shown in shifted position and Fig. 5 is a detail view with the parts shown in mid-position.

In the construction shown, the ribbon 1 is connected by fastening clips 2 to the ends of a pair of short, thick pieces or strips 3 of felt or the like, the opposite ends of which are fixed to the hubs of a pair of spools 4. These spools are mounted upon shafts 5 which are suitably journaled in supports 6 constituting part of the frame of the machine. In the form shown, the spool shafts 5 are horizontally disposed and are provided at their rear ends with beveled gears 7 that are adapted to be engaged by a pair of beveled pinions 8 mounted on the ends of a longitudinal shaft 9. The shaft 9 is longitudinally shiftable in suitable supports 10 to

cause the gears 8 to alternately engage the gears 7 and thereby drive one or the other of the spools 4. The shaft 9 is continuously driven from a suitable source of power and, in the particular ribbon drive mechanism illustrated, constitutes the shiftable coupling device which alternately connects the ribbon spools to the drive wheel or shaft, or other suitable source of power.

In the form shown, a beveled pinion 11 is driven from the carriage propelling drum 12 through the medium of a pawl 13 on the drum which engages the ratchet 14 connected to the gear. The gear 11 meshes with a gear 15 which is keyed to the shaft 9. The hub of the gear 15 is journaled in the bracket 10 and the gear itself is held against longitudinal movement. An enlarged portion 16 is fastened to the hub of the gear 15 and a pin or roller 17 fixed to the shaft extends within a longitudinal slot formed in the enlarged portion 16. By this means, the shaft 9 is driven by the gear 15 and at the same time is free to shift longitudinally to connect either one of the ribbon spools to the main drive wheel 14.

The shaft 9 is moved longitudinally by a ribbon controlled member or shifter 18 that is centrally mounted upon a pivot pin 19. The pin 19 extends through a longitudinal slot 20 formed in the lower portion of a supporting plate or bracket 21 which is fixed to the supports 10 at its ends. The pivot pin 19 is provided on its rear end with an enlarged head or disk 22 which is arranged between a pair of collars 23 fixed to the shaft 9. The space between the collar 23 is greater than the diameter of the head or disk 22 and these parts form a lost-motion connection between the shifter 18 and the movable coupling device or shaft 9. Preferably, also, the shaft 9 is provided on opposite sides of one of the supports 10 with a pair of stops or collars 24 which are arranged to engage the support and thereby limit the throw of the shaft. These stops prevent the jamming of the beveled gears 7 and 8 when the shaft 9 is shifted.

The shifter 18 is provided at one end with an enlarged slot 25 having teeth 26 in its upper and lower edges. The latter are adapted to cooperate with the teeth of a ratchet wheel 27 on the forward end of a short shaft 28. The latter is journaled in suitable supports 29 and 30 and is provided on its inner end with a beveled gear 31

which is arranged to mesh with the gear 15. The ratchet 27 is thus rotated in the direction indicated by the arrow in Fig. 2, but the shifter 18 is normally held in mid-position with the teeth 26 disengaged from the ratchet wheel. For this purpose a leaf spring 32 is centrally fixed to a stud 35 on the upper central portion of the bracket 21 and the ends thereof bear upon the ends of the shifter 18.

A pair of shafts 34 are journaled in supports 35 which depend from the frame member 6, and the ends of these shafts are provided with fingers or arms 36 and 37. The arms 36 at the rear ends of the shafts extend beneath the ends of the shifter 18 and springs 38 coiled about the shafts hold the fingers 37 on the forward ends thereof in engagement with the ribbon on the spools 4.

When the ribbon is unwound from either spool, the corresponding finger 37 drops over the fixed end of the thick strip of felt on such spool to thereby move the shifter 18 through the medium of one of the fingers 36 and engage one of the sets of teeth 26 of the shifter with the actuator wheel or ratchet 27.

It should be noted that the racks on the end of the shifter 18 have only sufficient teeth to initially move the shifter when engaged with the actuator wheel or ratchet 27. Preferably, this initial movement is almost if not quite sufficient to take up the lost-motion between the disk or head 22 and the collars 23, and means are provided for completing the throw of the shifter 18 to thereby move the coupling device 9 after the lost-motion between these parts has been taken up by the driving gearing. For this purpose, in accordance with the preferred form of the invention, a shiftable or pivoted cam of triangular outline and a pair of co-operating spring actuated cam followers are provided. The triangular cam 39 is preferably mounted upon the pivot pin 19. The followers are preferably in the form of U-shaped levers 40 connected at their outer ends by pivot pins 41 to the supporting plate or bracket 21 and provided on their inner ends with rollers 42 which engage the cam 39. The levers or cam followers 40 are provided with an actuating spring or springs. Preferably, as shown, they are connected by an actuating spring 43. Preferably, also, an additional actuating spring 44 is provided for the upper lever or cam follower. This spring, as shown, is fixed to a pin 45 on the upper portion of the bracket 21 and engages the end of the upper lever 40. The cam 39 is triangular, as stated, and is preferably in the form of an equilateral triangle, except that its lower corner 46 is cut off or truncated, as shown.

As shown in Figs. 1, 2 and 3, the mechanism is in position to rotate the left hand

ribbon spool and wind the ribbon thereon. As it is unwound from the right hand spool, the corresponding finger 37 drops over a fixed end of the thick strip 3 and lifts the right hand end of the member 18. This depresses its left hand end and engages the upper side of rack teeth 26 with the actuator wheel or ratchet 27. The shifter is then initially moved toward the right by means of the actuator gear 27, so that the disk or head 22 on the pivot pin 19 of the shifter is moved toward the right hand collar 23 on the shaft 9. Preferably, this initial movement of the shifter 18 merely serves to take up the lost-motion between the disk 22 and the collar 23. As the shifter is thus moved toward the right, the triangular cam 32 forces the spring actuated followers 40 apart, as shown in Fig. 5. When the parts are moved to about the position shown in Fig. 5, the upper follower presses on the upper corner of the triangular cam and moves its lower truncated corner 46 past the roller of the lower follower, and the rollers then act upon the inclined faces 47 and 48 of the cam to complete the movement of the shifter toward the right and into the position shown in Fig. 4. This additional movement of the shifter effected by means of the triangular cam and the coöperating, spring-actuated cam followers, serves to throw the movable coupling device or shaft 9 toward the right. The left hand ribbon spool is thus disconnected from the main drive wheel and the right hand ribbon spool is connected thereto to reverse the direction of travel of the ribbon. The operation as described is reversed when the ribbon is unwound from the left hand spool.

It should be noted that the roller 42 of the upper cam follower or lever always operates upon the face 47 of the triangular cam, while the roller of the lower follower acts upon the faces 49 and 48 on opposite sides of the truncated corner 46. As the parts are shifted, the upper follower acts upon the ends of the face 47 to quickly tilt or swing the cam upon the pivot 19 and thus move its lower truncated corner past the roller 42 on the lower follower. As soon as the cam is thus shifted, the followers then act to complete the throw of the shifter and to effect the movement of the coupling device.

It should be noted that the final movement of the coupling device and, in the preferred form shown, the entire movement thereof is effected by spring-actuated means, power being stored in the actuating spring by the initial movement of the shifter. The stored power in the actuating spring acts to effect or complete the throw of the coupling means almost instantaneously, so that the reversing operations of the ribbon drive mechanism are accomplished with great certainty. The pivoted cam avoids any "dead center"

which might otherwise prevent the proper operation of the reversing mechanism. It should be noted, that in the preferred form shown, as soon as the shifter 18 has been moved far enough by the actuator wheel or ratchet 27 to effect the reversal of the triangular pivoted cam 39, the rest of the movement of the shifter and the throw of the movable coupling device or shaft 9 is effected solely by the operation of the spring actuated followers upon the cam and independently of the power driven actuator wheel 27. The additional actuating spring 44, which is preferably employed, assists the upper follower in reversing the position of the triangular cam by moving its lower truncated end past the lower follower.

Obviously, the details set forth may be varied and the improvement applied to ribbon driving and reversing mechanisms of other types without departure from the essentials of the invention as defined in the claims.

I claim as my invention:—

1. The combination with a ribbon drive mechanism having a member shiftable to reverse the same, of means for initially moving said member, a relatively shiftable cam connected to said member and a pair of spring actuated followers coöperating with said cam to complete the throw of said member.

2. The combination with a ribbon drive mechanism having a member shiftable to reverse the same, of means for initially moving said member, a cam shiftable mounted on said member, and a pair of spring actuated followers coöperating with said cam to complete the throw of said member.

3. The combination with a ribbon drive mechanism having a member shiftable to reverse the same, of means for initially moving said member, and means for completing the throw of said member comprising a triangular cam pivotally mounted on said member, and a pair of spring actuated cam followers.

4. The combination with a ribbon drive mechanism having a member shiftable to reverse the same, of means for initially moving said member, and means for completing the throw of said member comprising a triangular cam, and a pair of spring actuated followers coöperating with said triangular cam, the latter having a truncated corner adapted to move past one of said followers.

5. The combination with a ribbon drive mechanism having a member shiftable to reverse the same, of means for initially moving said member, and means for completing the throw of said member comprising a shiftable cam, a pair of pivoted levers coöperating with said cam, and an actuating spring connecting said levers.

6. The combination with a ribbon drive mechanism having a member shiftable to reverse the same, of means for initially moving said member, and means for completing the throw of said member comprising a triangular, pivoted cam, a pair of followers coöperating with said cam, and an actuating spring connecting said followers, said triangular cam having a truncated corner adapted to move past the end of one of said followers.

7. The combination with a frame and a ribbon drive mechanism having a member shiftable to reverse the same, of ribbon-controlled, power actuated means for initially shifting said member, and means for completing the throw of said member comprising a triangular cam pivotally mounted on said member, and a pair of spring-actuated levers pivotally mounted on the frame and having rollers engaging said triangular cam, one corner of the latter being adapted to move past one of said rollers.

8. The combination with a frame and a ribbon drive mechanism having a member shiftable to reverse the same, of ribbon-controlled, power actuated means for initially shifting said member, and means for completing the throw of said member comprising a triangular cam pivotally mounted on said member, a pair of levers pivoted on the frame and having rollers engaging said triangular cam, and an actuating spring connecting said levers, said triangular cam having a truncated corner adapted to move past the roller of one of said levers, and a second spring engaging the other of said levers.

9. The combination with a pair of ribbon spools, drive mechanism therefor, and a shiftable coupling member for alternately connecting said spools and said drive mechanism, of a ribbon-controlled shifter for said coupling member, and means for completing the throw of said member comprising a cam pivoted on said shifter, and a pair of spring actuated followers coöperating with said cam.

10. The combination with a pair of ribbon spools, drive mechanism therefor, and a shiftable coupling member for alternately connecting said spools and said drive mechanism, of a ribbon-controlled shifter for said coupling member, and means for completing the throw of said member comprising a pivoted triangular cam and a pair of spring-actuated followers having rollers engaging said triangular cam, one corner of the latter being adapted to move past one of said followers.

11. The combination with a pair of ribbon spools, drive mechanism therefor, and a shiftable coupling device for alternately connecting said spools to said drive mechanism, of a shifter for said coupling de-

vice having a lost motion connection therewith, means for initially actuating said shifter, and means for completing the throw of said shifter comprising a relatively shift-
5 able cam connected to said shifter and a pair of spring-actuated followers engaging said cam.

12. The combination with a pair of ribbon spools, drive mechanism therefor, and
10 a shiftable coupling device for alternately connecting said spools to said drive mechanism, of a shifter for said coupling device having a lost motion connection therewith, means for initially actuating said
15 shifter, and means for completing the throw of said shifter comprising a pivoted triangular cam, and a pair of spring-actuated followers cooperating with said triangular cam, the latter having a truncated corner
20 adapted to move past one of said followers.

13. The combination with a pair of ribbon spools, drive mechanism therefor, and a shiftable coupling device for alternately connecting said spools to said drive mechanism,
25 of a shifter for said coupling device having a lost motion connection therewith, means for initially actuating said shifter, and means for completing the throw of said shifter comprising a triangular cam pivoted
30 on said shifter, and a pair of spring-actuated pivoted levers having rollers engaging said cam.

14. The combination with a pair of ribbon spools, drive mechanism therefor, and a shiftable coupling device for alternately connecting said spools to said drive mechanism,
35 of a shifter for said coupling device having a lost motion connection therewith, means for initially actuating said shifter, and means for completing the throw of said shifter comprising a triangular cam pivoted
40 on said shifter, a pair of pivoted levers having rollers engaging said cam, and an actuating spring connecting said levers, said triangular cam having a truncated corner
45 adapted to move past one of said rollers.

15. In a typewriting machine, the combination with a carriage propelling drum, a pair of ribbon spools and a main drive wheel
50 for said spools driven from said drum, of coupling means for alternately connecting and disconnecting said spools and said wheel, a shifter for said coupling means having a lost-motion connection therewith,
55 a rotary actuator gear connected to and driven by said drum and arranged to initially move said shifter in opposite directions to take up the lost motion between the same and said coupling means, a spring device for completing the throw of said shifter and said coupling means, and means controlled by the movement of the ribbon for throwing said shifter and said actuator into
60 operative relation, substantially as described.
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16. In a typewriting machine, the combination with a pair of ribbon spools and a main drive wheel therefor, of coupling means for alternately connecting and disconnecting said spools and said wheel, a shifter for said coupling means having a lost-motion connection therewith, an actuator for moving said shifter longitudinally in opposite directions to take up the lost motion between the same and said coupling
75 means, and means controlled by the movement of the ribbon for moving said shifter transversely in opposite directions into engagement with said actuator.

17. In a typewriting machine, the combination with a pair of ribbon spools, separate spool shafts and a main drive wheel therefor, of coupling means for alternately connecting and disconnecting said spool shafts and said drive wheel, a shifter for
80 said coupling means having a lost motion connection therewith, a rotary actuator gear connected to and driven by said main drive wheel and arranged to initially move said shifter in opposite directions, a spring device for completing the movement of said shifter and said coupling means, and a pair of arms associated with said spools and controlled by the unwinding of the ribbon therefrom for effecting the engagement of
85 said shifter and said actuator.
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18. In a typewriting machine, the combination with a pair of ribbon spools and drive mechanism therefor, of a centrally pivoted, longitudinally movable reversing
100 shifter, an actuator for moving said shifter longitudinally in opposite directions to reverse said drive mechanism, and a pair of fingers controlled by the movement of the ribbon and arranged to engage said shifter
105 to move the same transversely in opposite directions into engagement with said actuator.

19. In a typewriting machine, the combination with a pair of ribbon spools and a main drive wheel therefor, of coupling means movable to alternately connect said spools to said drive wheel, a centrally pivoted, longitudinally movable shifter for said coupling means, an actuator gear connected to and driven by said drive wheel, said shifter having two sets of rack teeth on opposite sides of said actuator gear, a spring normally holding said shifter in central position with said rack teeth out of engagement with said gear, and a pair of fingers controlled by the movement of the ribbon and engaging said shifter to move the same transversely in opposite directions to bring one or the other of said sets of rack teeth
110 into engagement with said actuator gear.
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20. In a typewriting machine, the combination of a pair of ribbon spools, a drive shaft for said spools, beveled gears connecting said shaft and said spools, said
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shaft being longitudinally shiftable to engage and disengage said gears, a shifter for said shaft having a lost motion connection therewith, an actuator for initially moving said shifter in opposite directions, a spring device for completing the movement of said shifter and said shaft, and means controlled by the movement of the ribbon for throwing said shifter and said actuator into operative relation.

21. In a typewriting machine, the combination with a pair of ribbon spools and a carriage drum, of a shaft driven from said drum, bevel gears connected to said shaft and said spools, said shaft being longitudinally shiftable to engage and disengage said gears, a shifter for said shaft having a lost-motion connection therewith, a rotary actuator driven by said drum for initially moving said shifter in opposite directions, a spring device for completing the movement of said shifter, and a pair of arms associated with said spools and controlled by the unwinding of the ribbon therefrom for throwing said shifter and said actuator into operative relation.

22. In a typewriting machine, the combination with a pair of ribbon spools and a carriage drum, of a shaft driven from said drum, bevel gears connected to said shaft and said spools, said shaft being longitudinally shiftable to engage and disengage said gears, a shifter for said shaft, a rotary actuator driven from said drum for initially moving said shifter in opposite directions, a spring device for completing the movement of said shifter, and a pair of arms associated with said spools and controlled by the unwinding of the ribbon therefrom for moving said shifter into operative relation with said actuator.

23. In a typewriting machine, the combi-

nation with a pair of ribbon spools, of a drive shaft, bevel gears connected to said shaft and said spools, said shaft being longitudinally shiftable to engage and disengage said gears, a shifter for said shaft having a combined pivotal and sliding movement and provided with two sets of rack teeth, an actuator gear interposed between said rack teeth and arranged to move said shifter longitudinally in opposite directions, a spring for holding said shifter in position with said teeth out of engagement with said gear, and a pair of devices controlled by the movement of the ribbon for moving said shifter transversely in opposite directions to engage said sets of rack teeth with said gear.

24. In a typewriting machine, the combination with a pair of ribbon spools, of a drive shaft, bevel gears connected to said shaft and said spools, said shaft being longitudinally shiftable to engage and disengage said gears, a shifter for said shaft having a lost-motion connection therewith, said shifter being provided with two sets of rack teeth, an actuator gear cooperating with said rack teeth to initially move said shifter longitudinally in opposite directions, a spring device for completing the longitudinal movement of said shifter, a spring for holding said shifter in position with said rack teeth out of engagement with said gear, and a pair of arms associated with said spools and controlled by the unwinding of the ribbon therefrom for moving said shifter transversely in opposite directions to engage said rack teeth with said gear.

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