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A. EKMAN

RIBBON MECHANISM

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Fig. 1.

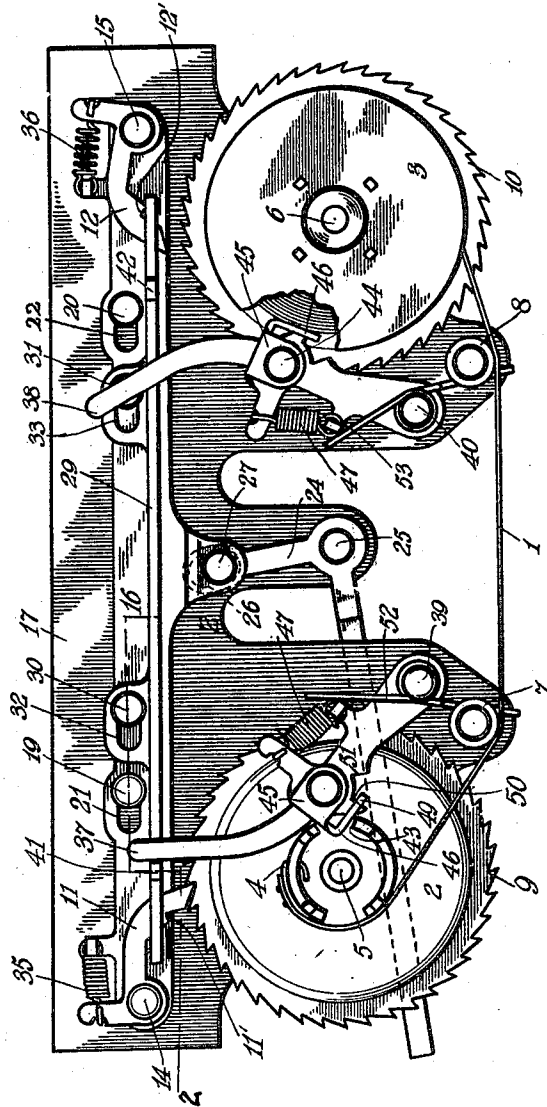
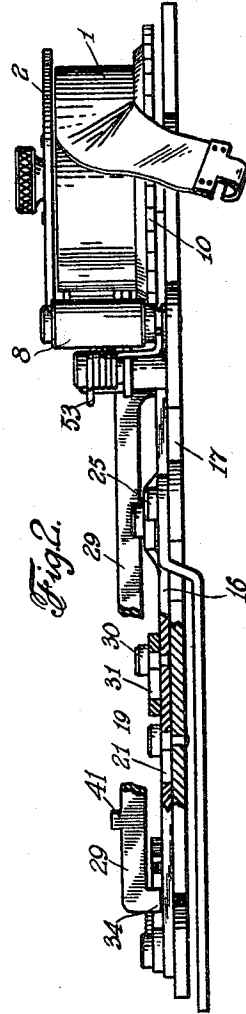


Fig. 2.



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UNITED STATES PATENT OFFICE.

ANDREW EKMAN, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BLEICK SYNDICATE, COMPOSED OF WILLIAM D. BLEICK AND D. H. CONNOR, BOTH OF NEWARK, NEW JERSEY, AND F. J. PARKER AND J. J. HARRIS, BOTH OF MONTCLAIR, NEW JERSEY.

RIBBON MECHANISM.

Application filed November 14, 1921. Serial No. 514,883.

To all whom it may concern:

Be it known that I, ANDREW EKMAN, a subject of the King of Sweden, and a resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Ribbon Mechanism, of which the following is a specification.

My invention relates to ribbon mechanism and more particularly to such mechanism suitable for adding machines and in which ribbon travels transversely across the type and has its end portions mounted respectively on spools, the mechanism automatically reversing the direction of movement of the ribbon approximately when either end of the latter is unwound from its spool.

The object of the invention is to provide a simple and efficient device of this character. Other objects, features and advantages will appear more fully in the following detailed description and appended claims.

The accompanying drawings forming a part of this specification illustrate one embodiment of the invention. In the drawings,

Fig. 1 is a plan view of the said embodiment of the invention, the parts being shown immediately after the reversal of the mechanism.

Fig. 2 is a view partly in elevation and partly in section taken on the line 2—2 of Fig. 1.

Referring to the drawings, a ribbon 1 is wound about two spools 2 and 3 respectively and is fastened to the cores of the spools, as by clips 4 secured to the respective ends of the ribbon and hooked into the cores of the respective spools. The spools are mounted for rotation upon studs 5 and 6 respectively. The portion of the ribbon between the spools and adjacent the type (not shown) is guided by idler pulleys 7 and 8.

The bottom flanges of the spools have secured thereto ratchet wheels 9 and 10 respectively, the teeth of the ratchet wheels being adapted to be engaged by the feed pawls 11 and 12 respectively. These pawls are pivoted at 14 and 15 respectively to an actuating bar 16 which is mounted upon the frame 17, being guided for longitudinal re-

ciprocation by headed studs 19 and 20 which are secured to the base 17 and pass through longitudinal slots 21 and 22 respectively in the said bar 16. The latter is reciprocated, as shown, by a lever 24 pivoted at 25 and one arm of which is provided with a slot 26 containing a stud 27 on the bar 16. The other arm of the lever 24 may be connected for oscillation to the mechanism of the adding machine, being preferably oscillated back and forth for each back and forth movement of the handle of the machine.

Mounted upon the bar 16 is a reversing bar 29, the latter being guided for longitudinal movement with respect to the bar 16 by headed studs 30 and 31 carried by the bar 16 and passing through longitudinal slots 32 and 33 respectively in the reversing bar 29. The reversing bar is provided with projecting end portions 34 (see Fig. 2) which are adapted alternately to engage pawls 11 and 12 to move the latter out of engagement with the corresponding ratchet wheels 9 and 10 against the influence of the springs 35 and 36 which tend respectively to hold the pawls 11 and 12 in engagement with the corresponding ratchet wheels.

The reversing bar 29 is shifted or operated to move one pawl out of engagement with its ratchet wheel and permit the other pawl to engage its ratchet wheel by levers 37 and 38 which, as shown, are pivoted at 39 and 40. The reversing bar is provided with projections 41 and 42 which are adapted to be engaged respectively by the outer end portions of the levers 37 and 38. The core of each spool is provided with a recess or opening 43 which is normally covered by the ribbon but which is uncovered when the ribbon is, as shown, approximately entirely unwound from a spool. Each of the levers 37 and 38 has pivoted thereto, as at 44, a lever 45 which has an angular portion 46 adapted to pass into the opening 43 when the ribbon is substantially unwound from the corresponding spool to thereby permit sufficient pivotal movement of the levers 37 or 38 to shift the reversing bar 29. A spring 47 tends to hold each of the levers 45 in operative position with respect to its supporting lever, the movement of the lever 45 by the spring 47 being limited by the engage-

ment of a downwardly projecting lug 49 upon the lever 45 with shoulder 50 on the lever 37 or 38. By reason of the yielding mounting of the levers 45 they are adapted to be easily tilted with respect to their supporting levers by the edges of the recesses and thereby easily moved out of the recesses to permit winding movement of the spools. This tilting movement of the levers 45 may be limited by engagement of the lugs 49 with shoulders 51 on the levers 37 and 38. Springs 52 and 53 hold the levers 37 and 38 in position with respect to the spools and tend to move the said levers so as to carry the portion 46 of the levers 45 towards the openings 43. The pawls 11 and 12 are provided with offset portions 11' and 12' respectively which are adapted to engage the sides of the projections 34 of the reversing bar 29 when the pawls are held in inoperative position. This arrangement holds the reversing bar sufficiently firmly by friction to prevent its premature or accidental movement.

The operation of the mechanism is as follows: Supposing the mechanism in the position shortly preceding that shown in Fig. 1 and with the flat outer or shoe portion 46 of the lever 45 resting against the ribbon shortly before one of the recesses is uncovered. Under these conditions let us say that the ribbon is being wound upon the spool 2, the pawl 11 being in engagement with the ratchet wheel 9 and the pawl 12 out of engagement with the ratchet wheel 10. As soon as the recess 43 in the spool 3 is uncovered by the ribbon, the spring 53 moves the lever 38 abruptly towards the axis of the spool 3, the part 46 of the lever 45 carried by the lever 38 dropping into the opening 43. By this movement the lever 38 through its engagement with the projection 42 shifts the reversing bar 29 to move the pawl 11 out of engagement with the ratchet wheel 9 and to permit the pawl 12 to be moved under the influence of its spring 36 into engagement with the ratchet wheel 10. Thereupon reciprocation of the actuating bar 16 results in the rotation of the spool 3 to cause the ribbon to be wound thereon and to be unwound from the spool 2. Such movement of the ribbon continues until the recess or opening 43 in the core of the spool 2 is uncovered by the ribbon when the mechanism is again reversed in a like manner and the ribbon is again fed into the spool 2.

It is to be understood that many changes may be made in the construction shown without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. The combination of ribbon spools having recesses adapted to be covered by the ribbon, a ratchet wheel for each spool, a longitudinally reciprocable actuating member, a pawl carried by said member for each ratchet wheel, a reversing member carried by said actuating member and movable relatively thereto to move one pawl out of operative relation to its ratchet wheel and to free the other pawl for engagement with its ratchet wheel, and means engaging the recesses in said spools for automatically shifting said reversing member relatively to said actuating member when the ribbon is unwound from a spool.

2. The combination of ribbon spools having recesses adapted to be covered by the ribbon, a ratchet wheel for each spool, a longitudinally reciprocable actuating member, a pawl carried by said member for each ratchet wheel, a reversing member carried by said actuating member and movable relatively thereto to move one pawl out of operative relation to its ratchet wheel and to free the other pawl for engagement with its ratchet wheel, and automatic means for shifting said reversing member relatively to said actuating member when the ribbon is unwound from a spool, said automatic means comprising a member adjacent each spool and tending to move towards a recess, said last named member having a portion arranged to engage and operate said reversing member and being provided with means adapted to enter the recess.

3. The combination of ribbon spools having recesses adapted to be covered by the ribbon, a ratchet wheel for each spool, a longitudinally reciprocable actuating member, a pawl carried by said member for each ratchet wheel, a reversing member carried by said actuating member and movable relatively thereto to move one pawl out of operative relation to its ratchet wheel and to free the other pawl for engagement with its ratchet wheel, and automatic means for shifting said reversing member relatively to said actuating member when the ribbon is unwound from a spool, said automatic means comprising a spring pressed lever adjacent each spool and tending to move towards a recess, said lever having a portion arranged to engage and operate said reversing member and being provided with means adapted to enter the recess.

4. The combination of ribbon spools having recesses adapted to be covered by the ribbon, actuating devices for the respective spools, and means to render either of the actuating devices operative and the other inoperative and comprising an operating lever adjacent each spool and tending to move towards a recess, said lever carrying a pivoted member having a portion adapted to enter the recess when the latter is uncovered but yieldable to be thereafter moved

by the spool relatively to said operating lever and out of the recess.

5 5. The combination of ribbon spools having recesses adapted to be covered by the ribbon, a ratchet wheel for each spool, a longitudinally reciprocable actuating member, a pawl carried by said member for each ratchet wheel, a reversing member carried by said actuating member and movable
10 relatively thereto to move one pawl out of operative relation to its ratchet wheel and to free the other pawl for engagement with its ratchet wheel, and automatic means for shifting said reversing member relatively
15 to said actuating member when the ribbon is unwound from a spool, said automatic means comprising a spring pressed lever adjacent each spool and tending to move towards a recess, said lever having a
20 portion arranged to engage and operate said reversing member and carrying a spring pressed member having a portion adapted to ride upon the ribbon and enter the recess when the latter is uncovered by the ribbon
25 but yieldable to be thereafter moved by the spool relatively to said first named lever and out of the recess.

6. The combination of ribbon spools having recesses adapted to be covered by the
30 ribbon, a ratchet wheel for each spool, a longitudinally reciprocable actuating member, a pawl carried by said member for each ratchet wheel, a reversing member carried

by said actuating member and movable relatively thereto to move one pawl out of operative relation to its ratchet wheel and to
35 free the other pawl for engagement with its ratchet wheel, said pawls coacting with said reversing member to yieldingly hold the same in position with respect to said actuating member, and means co-operating with
40 the recesses in said spools for automatically shifting said reversing member relatively to said actuating member when the ribbon is unwound from a spool. 45

7. The combination of ribbon spools, a ratchet wheel for each spool, a longitudinally reciprocable actuating bar, a pawl carried by said bar for each ratchet wheel, a
45 spring tending to move each pawl into operative relation to its ratchet wheel, a reversing bar carried by said actuating bar and movable longitudinally relatively thereto to
50 move one pawl out of operative relation to its ratchet wheel to free the other pawl for engagement with its ratchet wheel, said
55 pawls coacting with said reversing bar to frictionally hold the same in position with respect to said actuating bar, and automatic means for shifting said reversing bar
60 relatively to said actuating bar when the ribbon is unwound from a spool.

In testimony whereof, I have signed my name to this specification.

ANDREW EKMAN.