N. WHITE.

RIBBON FEEDING MECHANISM.

APPLICATION FILED MAY 6, 1914.

1,196,622.

Patented Aug. 29, 1916.

3 SHEETS—SHEET 1.

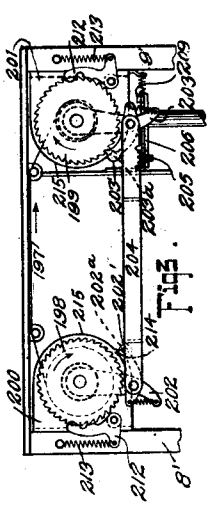


Fig. 3.

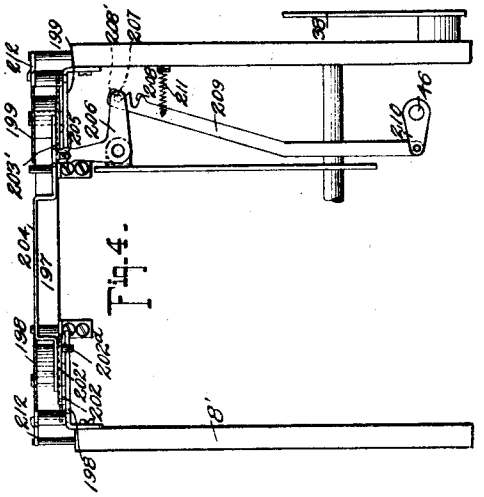


Fig. 4.

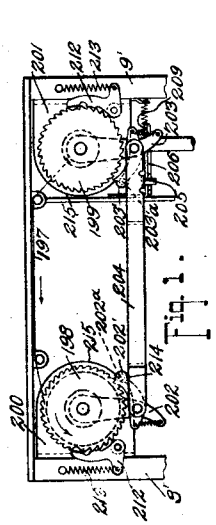


Fig. 1.

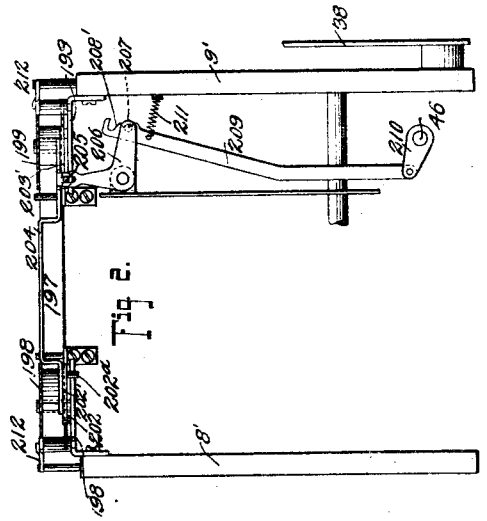


Fig. 2.

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3 SHEETS—SHEET 2.

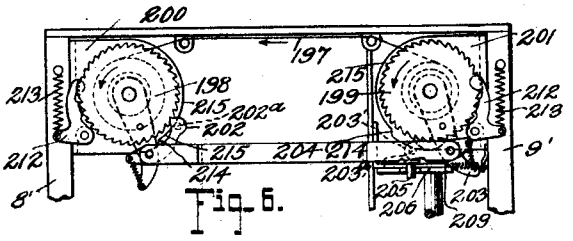


Fig. 6.

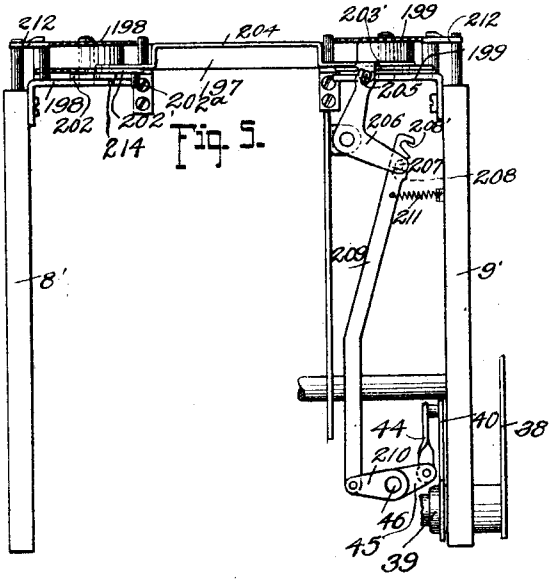


Fig. 5.

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3 SHEETS—SHEET 3.

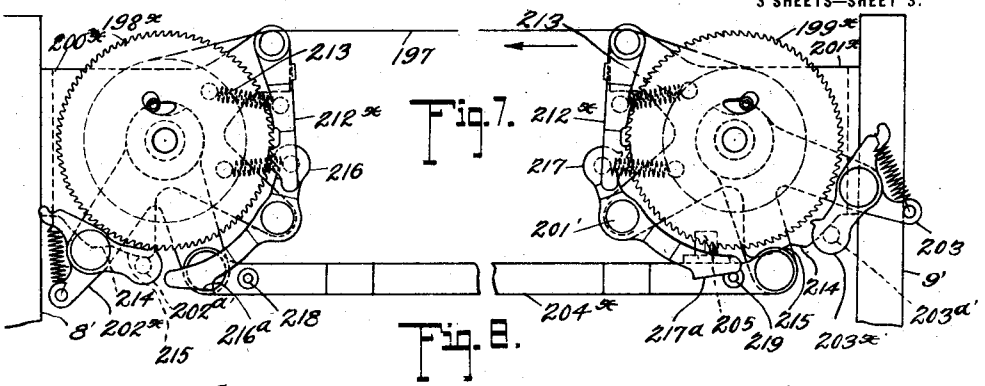


Fig. 7.

Fig. 8.

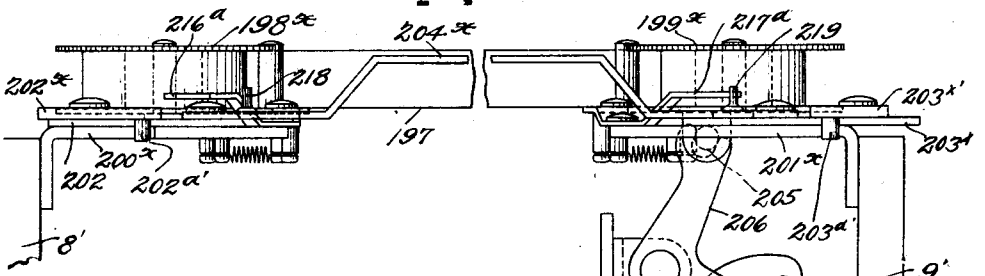
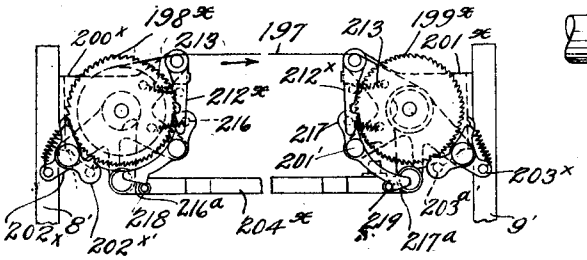


Fig. 9.



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UNITED STATES PATENT OFFICE.

NELSON WHITE, OF PORTLAND, OREGON, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INTERNATIONAL MONEY MACHINE COMPANY, OF TERRE HAUTE, INDIANA, A CORPORATION OF INDIANA.

RIBBON-FEEDING MECHANISM.

1,196,622. Specification of Letters Patent. Patented Aug. 29, 1916.

Application filed May 6, 1914. Serial No. 836,771.

To all whom it may concern:

Be it known that I, NELSON WHITE, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Ribbon-Feeding Mechanism, of which the following is a specification.

The present invention comprises novel mechanism for controlling the feeding of an inking ribbon used for printing purposes in adding, typewriting and other machines, and for reversing the movement of said ribbon automatically.

The invention resides particularly in the peculiar instrumentalities whereby reverse movement of the ribbon is effected after it has been wound entirely upon one spool and unwound from another, the reversing action being controlled by tension on the ribbon caused by the termination of its unwinding movement.

For a full comprehension of the details of the invention, and the merit thereof, reference is to be had to the following description and to the accompanying drawings, in which—

Figure 1 is a fragmentary plan view showing the mechanism embodying the invention. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view of the parts showing them as when arranged after the reversal of the movement of the ribbon has been effected. Fig. 4 is a front elevation of the same. Figs. 5 and 6 show the mechanism in front elevation and top plan views, respectively, the parts being illustrated as when about to reverse; and Figs. 7, 8 and 9 are plan front and plan views respectively of a modification.

Throughout the following detail description and on the several figures of the drawings, similar parts are referred to by like reference characters.

As shown clearly in the drawings, the printing ribbon 197 is connected with spools 198 and 199 supported on stationary parts such as brackets 200 and 201, respectively, the latter being fastened to the inside of the frame members 8′ and 9′ at their upper rear ends. The spools 198 and 199 are of conventional form, their upper disks being toothed in opposite directions. The operation of the ribbon mechanism in reversing is entirely automatic. Arms 202 and 203 are provided respectively for the spools 198 and 199, to carry the feeding pawls 202′ and 203′, respectively. The pawls aforesaid are adapted to engage the teeth of the spools with which they coöperate, the arms 202 and 203 being pivoted to the axes of the adjacent spools and being connected by a drive link 204. The link 204 has a lateral stud 205 engaged with the upper arm of a bell crank 206 vertically arranged on the frame work of the machine, said bell crank having on its lower arm a stud 207 engageable by notches 208 and 208′ of a pull rod 209. The pull rod 209 is connected pivotally at its lower end with an arm 210 mounted on the selector bar operating shaft 46. A spring 211 cooperates with the pull rod 209 to normally maintain one or the other of the notches 208 and 208′ engaged with the stud 207. For each spool there is provided a pivoted retarding finger 212, yieldingly engaging the spool under the action of a tension spring 213. The brackets 200 and 201 are each formed with a cam 214 on the inner curved edge 215 thereof. The feeding pawl 202′ has a downwardly projecting pin 202^a and the pawl 203′ has a similar pin 203^a. It may be stated that the drive link 204 is reciprocated by the parts 46 and 209 in order to impart feeding movement to one of the spools 198 and 199 and with which it may coöperate at a predetermined time. As shown in Fig. 1, the pin 202^a of the feeding pawl 202′ is maintained in contact with the curved edge 215 of the bracket 200 and while in such contact, said pawl is operatively engaged with the teeth of the spool 198. At the same time, as shown in Fig. 1, the pin 203^a of the feeding pawl 203′ by reason of the position of the link 204, is held in engagement with the cam 214 of the bracket 201. Since the cam 214 is formed on an arc more remote from the axis of the adjacent spool than the edge 215 of the bracket, said cam is adapted when engaging the pin of either feeding pawl to maintain said pawl out of engagement with the teeth of the cooperating spool. Therefore, as the parts are shown in Fig. 1, the inking ribbon 197 is fed from the spool 199 to the spool 198 in the motion of the link 204 because the pin

202^a is in contact with the edge 215 of the bracket 200 and the pawl 202′ is engaged with the teeth of said spool 198. On the other hand, the feeding pawl 203′ during the movement of the link 204, is inoperative in relation to the teeth of the spool 199.

It will be apparent that, in order to reverse the movement of the ribbon 197, it is only necessary to reverse the operative relation of the pawls, as shown in Fig. 1, in respect to their adjacent spools. The ribbon 197, of course, will continue to feed on to the spool 198 according to the illustration in Fig. 1 until the terminal of the ribbon attached to the spool 199 is exposed and causes the ribbon to be placed under tension on the downward stroke of the pull rod 209. The tension on the ribbon momentarily prevents movement of the bell crank 206 and causes the stud 207 to slip from the notch 208, as shown in Fig. 2, into the notch 208′, as shown in Fig. 4. It will now be apparent that in the further operations of the machine, the bell crank 206, through the action of the pull rod 209 will cause the drive link 204 to travel in a path somewhat to the left of that in which it will travel, according to the showing of Fig. 1, and the new path of movement of the link 204 will maintain the feeding pawls 202′ and 203′ in the reverse positions shown in Fig. 3 and cause the pawl 203′ to rotate the spool 199 and feed the ribbon in a direction opposite to that in which it is feeding in Fig. 1. Obviously, a reversal of the feeding movement of the ribbon 197, when the parts are adjusted according to the illustration in Fig. 4, will be effected by substantially the same action as hereinbefore described, excepting that the next time the ribbon is under tension, the stud 207 will be transferred from the notch 208′ to the notch 208, during an upward movement of the pull rod 209.

It is contemplated that any conventional means may be employed to establish a driving connection between the handle 38 and the shaft 46, said handle being utilized as the main actuator of an adding machine, according to the preferred embodiment of the invention. As shown in Fig. 8, a cam 40 is carried by the shaft 39 to which the handle 38 is attached and said cam 40 operates a lever by a link 44 to a short arm 45 on the shaft 46. With the described connections between the handle 38 and the shaft 46, upon each movement of the handle 38, a reciprocatory movement will be imparted to the pull rod 209, and such movement is always transmitted to the link 204 except only when the movement of said link is retarded because of tension placed on the inking ribbon 197 when the latter is completely unwound from either spool. The connection between the lever 206 and member 209 is practically a floating connection therefore operating substantially in the manner previously set forth. While the arrangement of parts shown in the drawings would be preferably employed when the invention is used in connection with adding machines, it is apparent that a somewhat different arrangement would be necessary in typewriting and other machines, notwithstanding which the main parts described would be employed by utilizing special connections with an actuating member of some sort. During the act of reversal of the ribbon when one spool is empty and the other is feeding or trying to feed, the reaction on the ribbon while under tension tends to cause the driving spool to slip back and follow its feeding pawl thus preventing said pawl from taking another tooth on the next stroke. The above difficulty is obviated by the means shown in Figs. 7 to 9 inclusive wherein the arm 202^x is of angular form, one of its members having the feeding pawl $202^{x'}$ and the other having the link 204^x connected thereto. While the plates 200^x and 201^x are formed slightly different from the equivalent parts first described, they have cams coöperating with the studs $202^{a'}$ and $203^{a'}$ to render the respective pawls $202^{x'}$ and $203^{x'}$ operative or inoperative. Pivoted to the plates 200^x and 201^x are auxiliary or locking pawls 216 and 217 respectively. These pawls have tails extended to form cams 216^a and 217^a adapted to be engaged or disengaged by studs 218 and 219 respectively of the driving link 204^x. By reference to Fig. 7 it will be seen that when the left hand spool is feeding, stud 218 operates to the right of cam 216^a and hence the tooth of the pawl 216 is free to engage the teeth of the spool 198^x. At the same time stud 219 rides on the cam surface 217^a and holds pawl 217 out of engagement with its spool 199^x permitting rotation of the latter. When the ribbon is reversed (see Fig. 9) the operative relationship is reversed, stud 218 riding on the cam 216^a and stud 219 riding in the clear, permitting pawl 217 to engage spool 119. The retarding fingers 212^x are utilized as above.

Having thus described the invention, what is claimed as new is:

1. In combination, spools about which a ribbon is adapted to wind and unwind, feeding pawls associated with said spools to cause opposite feeding movements of the ribbon, a link operatively connected with said pawls, means whereby one pawl is maintained in engagement with its associated spool while the other is in an inoperative position, means to reciprocate the link longitudinally to cause feed movement of the pawls, means to shift the link to cause a reversal of the relative positions of said pawls and their associated spools, locking pawls for said spools each adapted to cooperate with its associated spool while the

adjacent feeding pawl is in engagement with said spool, and members intermediate said locking pawls and said link whereby to reverse the relative positions of the locking pawls and the spools as an incident to the corresponding reversal of the relative positions of the spools and the feeding pawls.

2. In combination, spools about which a ribbon is adapted to wind and unwind, feeding pawls associated with said spools to cause opposite feeding movement of the ribbon, a link operatively connected with said pawls, stationary parts coacting with said feeding pawls to hold one out of engagement with respect to the adjacent spool while the other acts to cause feeding movement of its adjacent spool, means to reciprocate said link to cause ribbon feeding action of the spools, and to shift the link longitudinally to reverse the relation of said pawls with respect to the stationary parts and thereby effect reverse ribbon feed action of said pawls in coöperating with the spools.

3. In combination, spools about which the ribbon is adapted to wind and unwind, supporting brackets for said spools provided with cams, arms pivotally connected with said supporting brackets, a link connecting said arms, feeding pawls carried by said arms and adapted to coact with the spools to cause feeding movements of the ribbon in opposite directions, means on each of said pawls coöperative with the cams aforesaid whereby one only of the feeding pawls normally coacts with the adjacent spool while the other is out of coöperation with regard to its spool, locking pawls coöperative with the spools and likewise one in engagement with its adjacent spool while the other is out of engagement with respect to its spool, means to shift the position of said link whereby the operative relation between the feeding pawls and the cams and spools is reversed, and studs on the link adapted to engage the locking pawls to reverse the relative positions of the same in relation to the spools simultaneously with the reversal of the feeding pawls.

4. In combination, spools about which a ribbon is adapted to wind and unwind, feeding pawls coöperating with said spools to rotate them in opposite directions, stationary cams for the pawls, one of which cams normally coacts with one of the feeding pawls to maintain the latter inoperative in relation to its spool, means for actuating said feeding pawls, and means controlled by abnormal tension on the ribbon to reverse the positions of said pawls in relation to their cams and thereby cause reverse feeding movement of the ribbon.

5. In combination, spools about which a ribbon is adapted to wind and unwind, feeding pawls associated with said spools to cause opposite feeding movement of the ribbon, supports for said spools provided with cams, one of which normally coacts with an adjacent pawl to hold the latter out of engagement with its spool and the other of which normally does not coact with the other pawl, means for operating said pawls, and means to reverse the relation of the pawls in respect to their cams and thereby cause a reversal of direction of feeding movement of the ribbon.

6. In combination, spools about which the ribbon is adapted to wind and unwind, pivoted arms associated with the spools, pawls carried by said arms to coöperate with the spools, brackets adjacent to the spools and having cams to coact with the pawls, a link connecting said arms so that one of the pawls coöperates with an adjacent cam normally and is thereby maintained inoperative in relation to its spool, a lever connected with the link, a pull rod connected with the lever, and means to shift the connection between the pull rod and the lever to thereby reverse the positions of the pawls in relation to their cams.

7. In combination, spools about which a ribbon is adapted to wind and unwind, feeding pawls associated with said spools to cause opposite feeding movement of a ribbon thereby, a link operatively connecting said pawls, means coöperative with the pawls whereby to hold either one in feeding coaction with respect to its adjacent spool while the other pawl is inoperative for such action in relation to its adjacent spool, means to impart certain reciprocatory movement to said link whereby to cause feeding actuation of said pawls, and to shift said link in the direction of its reciprocatory movement to change its position for such movement and reverse the feeding relation of the pawls with their respective spools.

In testimony whereof I affix my signature in the presence of two witnesses.

NELSON WHITE.

Witnesses:
G. A. Stock,
Frank Menefee.