(No Model.)

J. F. McLAUGHLIN.

INK RIBBON MECHANISM FOR TYPE WRITING MACHINES.

No. 409,613. Patented Aug. 20, 1889.

Fig. 1.

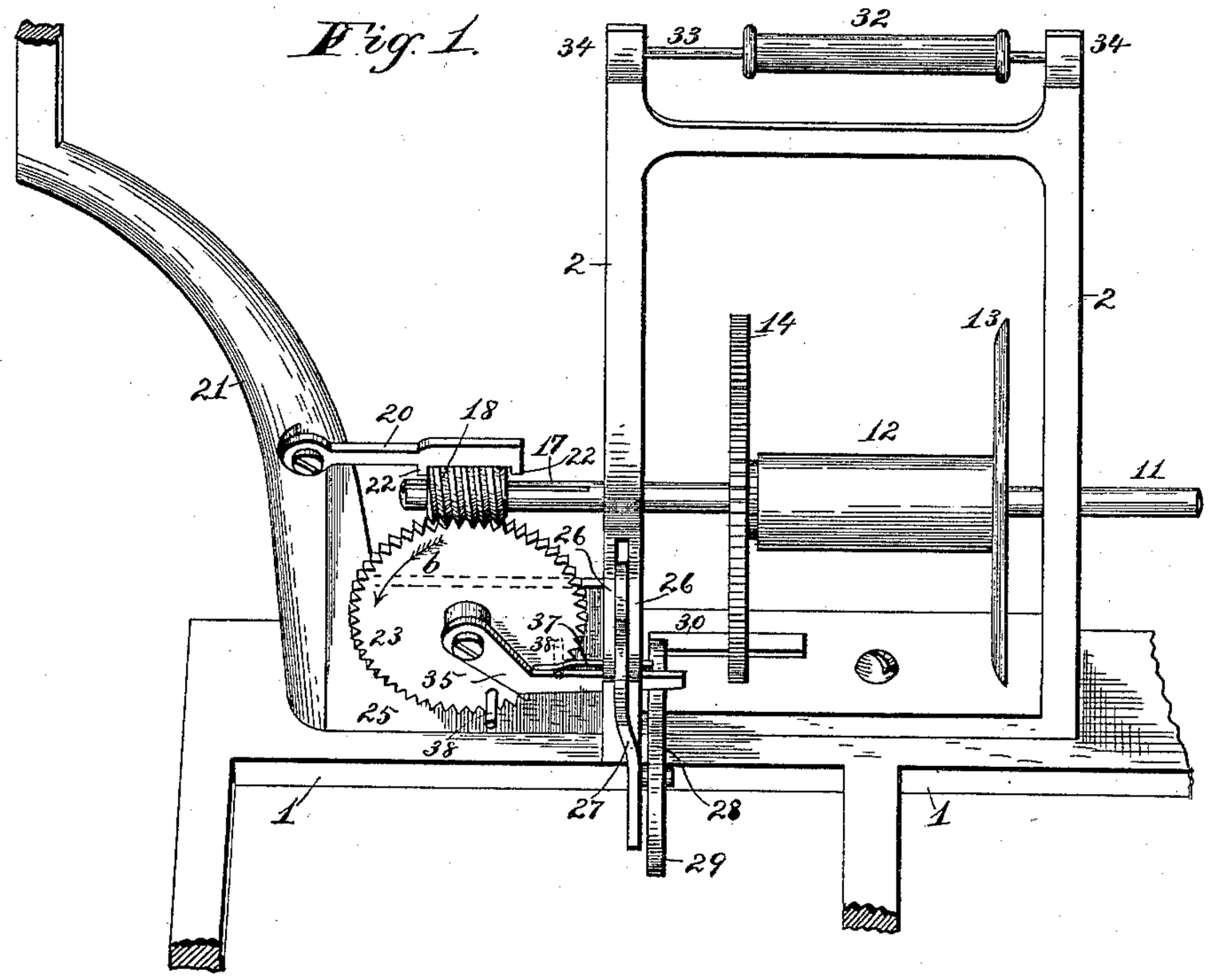
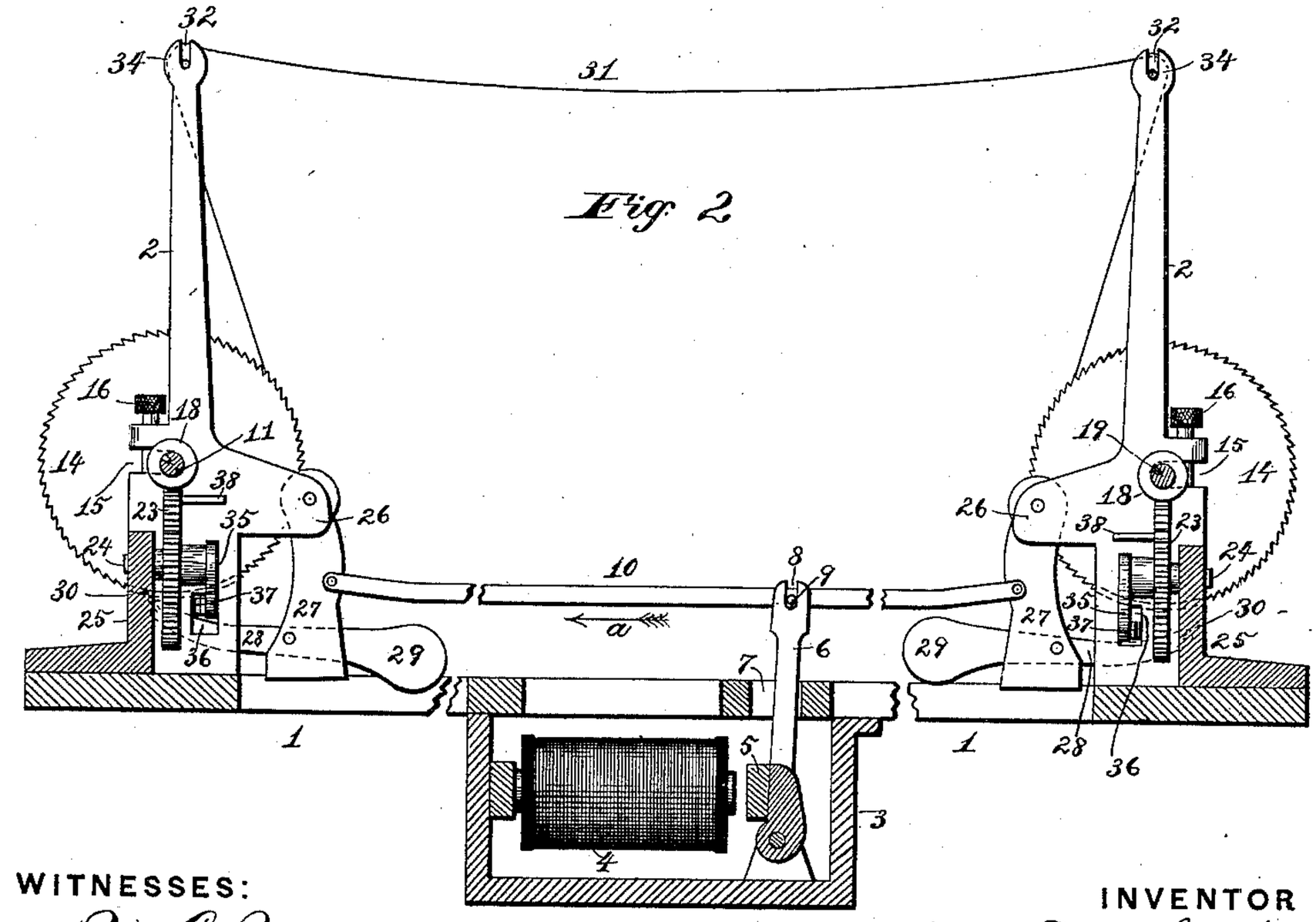


Fig. 2.



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INK-RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 409,613, dated August 20, 1889.

Application filed January 26, 1889. Serial No. 297,641. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ink-Ribbon Mechanism for Type-Writing Machines, of which the following is a specification.

My invention has reference to improvements in the ink-ribbon mechanism of type-writers generally, and of electric type-writers specifically, and the same is an improvement upon the apparatus for a like purpose shown and described in my application, Serial No. 276,151, filed June 5, 1888, and claimed specifically in my application, Serial No. 285,818, filed September 19, 1888.

The main object of this invention is, as in the cases referred to, to provide an ink-ribbon mechanism actuated by the letter-spacing mechanism of the type-writer, operating to feed the ink-ribbon under the impression-cylinder, and to reverse the feed of the ribbon automatically when the greater part of the same has passed under the impression-cylinder.

The specific points of novelty of my present invention will appear from the following detailed description thereof and from the appended claims. In this description reference is made to the accompanying drawings, which form a part thereof, and which clearly illustrate my invention.

Figure 1 is a perspective view of one section of the ink-ribbon mechanism as the same is mounted upon the frame of a type-writer, and Fig. 2 is a front elevation of the whole ink-ribbon mechanism with the supporting-frame and adjacent parts of the frame of the type-writer in section.

Like numerals of reference indicate like parts in both figures of drawings.

At each end of the frame 1 of the type-writer is mounted a rectangular frame 2, which supports one of the two sections of the ink-ribbon mechanism; but since these two sections are mere duplicates of each other the description of one will be applicable to both.

If the ink-ribbon mechanism is used in connection with electrical type-writers, there is a box 3 secured to the under side of the frame 1, and in said box is mounted an electro-magnet 4, actuating an armature 5, which is connected by mechanism (not here shown) with the letter-spacing mechanism of the type-writer, of which letter-spacing mechanism the armature forms a part; but in case my improved ink-ribbon mechanism is used in connection with an ordinary mechanical type-writer the element here shown as a pivoted armature is replaced by some other moving part of the machine, which, after each imprint of a letter, actuates the letter-spacing mechanism. From this armature or other letter-spacing element of the machine extends upwardly an arm 6, through a slot 7 in the frame 1 of the machine, and this arm has a slot 8 formed in its upper end for the reception of a pin 9, projecting laterally from a rod 10, extending from one section of the ink-ribbon mechanism at one end of the machine to the other section at the other end of the machine, so that when the armature 5, or other moving element of the letter-spacing mechanism, is vibrated in the normal operation of the machine after each imprint of a letter the rod 10 will receive a rectilinear oscillating movement.

For the purposes of my present invention it is of no consequence, as has been stated above, whether the structure marked by the numeral 5 is an armature, and is actuated by an electro-magnet, or whether the same is a purely mechanical element of the machine, so long as it receives an oscillatory or other to-and-fro movement after each imprint has been produced, and it will hereinafter be seen how such oscillatory or to-and-fro movement is utilized for feeding the ink-ribbon step by step under the impression-cylinder in one direction, and then to automatically reverse the ink-ribbon feed.

In each rectangular frame 2 is mounted upon a shaft 11 a ribbon-drum 12, one head of which 13 is of ordinary construction, while the other 14 is formed into a ratchet-wheel, as shown. Both heads are secured to the drum and to the shaft 11. This shaft 11 has its bearings in slots 15, formed in the side bars of the frame 2, and is prevented from lateral displacement by screws 16, all of which is clearly shown in Fig 2. While the shaft 11

is thus prevented from moving laterally, it is allowed to move longitudinally in its bearings, and the ribbon-drum 12, with its heads 13 14, will participate in this movement within the side bars of frame 2.

The shaft 11 is extended at both ends beyond the side bars of frame 2, and at one end it receives a longitudinal groove 17, and a worm 18, formed in the shape of a sleeve, is there fitted to the shaft, with an interior tongue 19 engaging the groove 17. Thus when the shaft rotates, the worm carried by the same will participate in this rotation, but will at the same time permit the shaft to move longitudinally through the same. The worm itself is prevented from longitudinal movement by a bracket 20, fixed to one of the standards 21 of the type-writer and extending over said worm, and having two lugs 22, which embrace the ends of the worm, forming, as it were, end bearings for the same. This worm 18 meshes with a pinion 23, fixed upon a short counter-shaft 24, having a journal-bearing in a bracket 25, which, in the construction shown, is an extension of the base of the standard 21, but which may also be an independent structure rising from the frame 1 of the type-writer.

Between a pair of lugs 26 26 projecting from each rectangular frame 2 is loosely pivoted an arm 27, to the free end of which is similarly pivoted a pawl 28, one end of which 29 is formed into a rather heavy bulb, tending to raise the other end, which is provided with an extended pawl-tooth 30, into engagement with the ratchet-wheel 14. The ends of the rod 10 are pivotally connected with the pawl-carrying arms 27 27; and it will now be understood that when the rod 10 is oscillated by the action of the letter-spacing mechanism, as hereinbefore described, the pawls 28 28 will rotate the ratchets 14 14 if at that time the pawls 28 28 should be in engagement with the same.

As will presently be explained, only one of the pawls is at any time in engagement with its respective ratchet, and under this supposition the automatic ink-ribbon-feeding operation is easily understood.

The ink-ribbon is secured at each end to one of the drums 12 12, and the greater portion of the ink-ribbon is wound upon one of these drums and extends from the same over a roller loosely mounted upon a shaft 33, secured in the upper part of rectangular frame 2 in bearings 34 34. From this roller 32 the ink-ribbon extends across the machine, under the impression-cylinder or platen, (not shown,) over a similar roller 32, similarly mounted in the rectangular frame fixed to the other end of the machine, and is there fixed to the second ink-ribbon drum. All this is clearly shown in Fig. 2, and supposing, now, that the greater portion of the ink-ribbon is wound upon the drum on the right-hand end of the machine, and that the pawl-tooth 30 at this end is out of engagement with its corresponding ratchet 14, while the pawl-tooth 30 at the other end of the machine is in engagement with its corresponding ratchet, as shown in the drawings, the automatic ink-ribbon-feeding operation is as follows: Immediately after the printing of a letter, numeral, or punctuation-mark the letter-spacing is produced by the movement of the arm 6, which in the construction shown is effected by the electro-magnet 4. By this movement the rod 10 is carried toward the left, as indicated by the arrow *a*, and the pawl 28 at the left-hand end of the machine being in engagment with its ratchet 14 this rachet is rotated the space of one tooth, and the drum 12 winds up a corresponding portion of the ink-ribbon. At the same time the pawl at the other end of the machine being out of engagement with its ratchet will vibrate idly, and the drum at this end will simply turn by the drag of the ink-ribbon upon it, paying out a portion of the latter. The letter-spacing operation having been accomplished by the vibration of arm 6 in one direction, said arm will return to its original position, either by the agency of a retractile spring or by gravity, as is common with armatures of electro-magnets, or by any other agency. This return movement carries the rod 10 back to its original position, and the active pawl-tooth takes hold of another ratchet-tooth, ready for the next feeding operation, while the inactive pawl vibrates idly back to its original position. Thus it will be understood that by continued operation of the type-writer the ink-ribbon is automatically fed step by step from one drum 12 under the platen onto the other drum, and it now remains to show how this feeding operation is automatically reversed. By the rotation of the shaft of drum 12 the pinion 23 is also rotated by means of the worm 18, as hereinbefore explained, and this movement of pinion 23 is utilized for automatically reversing the ink-ribbon feed.

To the shaft of pinion 23 is loosely hung an arm 35, the free end of which extends through a vertical slot 36, formed in the adjacent side bar of rectangular frame 2 and over the forward arm of the pawl 28. A flat spring 37, secured to arm 35, extends with the latter into the slot 36, so as to bear lightly against the wall of the same, whereby the arm 35 is sustained by friction in any position it may occupy within the slot. If arm 35 is turned down to the lower end of slot 36, its free end bears down upon the forward arm of the pawl and disengages the pawl-tooth 30 from the ratchet, as shown on the right-hand end of the machine in Fig. 2. If, on the other hand, the arm 35 is turned up to the upper end of slot 36, the forward arm of the pawl is released and its tooth is raised into engagement with the ratchet by the weight of the bulb 29, formed at its rear end, as shown at the left-hand end of the machine in Fig. 2.

The position of arm 35 within slot 36 is controlled by a pin 38 projecting from the face

of pinion 23. When this pinion rotates in the direction of the arrow *b*, marked in Fig. 1, the pin 38 is eventually carried under the lower edge of arm 35 and raises the same to the upper end of slot 36, thus allowing the pawl to fall into engagement with the ratchet; but when the pinion rotates in the opposite direction the pin 38 eventually bears down upon the upper edge of arm 35, forcing the same down to the lower end of slot 36, and thus disengaging the pawl from the ratchet, as hereinbefore described.

In Fig. 1 the pin 38 is shown in two positions with relation to arm 35 in solid and dotted lines, respectively. The position of the pin shown in solid lines corresponds to two phases of operation—viz., to that phase where the arm 35 is in its lowest position and holding the pawl out of engagement, and where the pinion rotates in the direction of arrow *b* and the pin 38 is about to raise the arm 35, and also to that phase where the arm 35 has been raised to its highest position, the pinion 23 having begun to rotate in the opposite direction and the pin 38 has just been carried away from the lower edge of arm 35. Similarly the position of pin 38 (shown in dotted lines) also corresponds to two phases of operation, as will now be readily understood. When the machine is set up, the pinion 23 at one end of the machine is turned to cause its pin 38 to raise the arm 35, while at the other end of the machine the pinion is turned until its pin 38 depresses the arm 35. If, now, the machine is started, one of the pawls will be active and the other inactive, and this relation will be automatically reversed after each very nearly complete rotation of the two pinions, and since one complete rotation of pinion 23 corresponds to a great number of rotations of the drums it will be seen that a great length of ink-ribbon will be fed from one drum over to the other before the reversal of the feed takes place. The operator is thus relieved from the necessity of watching the progress of the ink-ribbon feed and to reverse the same from time to time. At the same time the ribbon may be shifted laterally, as in ordinary type-writers, by moving the drums 12 12 in their bearings to the required positions. The groove-and-tongue connection of the shaft of each drum with its worm 18 and the lateral bearing which bracket 20 affords the worm permit this lateral adjustment without disturbing the operative relations of the parts.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. An ink-ribbon-feed mechanism for typewriters, consisting, essentially, of two ribbon-drums, pawls and ratchets for actuating the same by the letter-spacing mechanism of the machine, a pinion geared to each drum having an arm hung to its shaft adapted to bear upon the pawl to disengage the same from its ratchet, and a pin carried by each pinion for actuating one of the arms to release the pawl into engagement with its ratchet while the other is being locked out of engagement, substantially as described.

2. In an ink-ribbon-feed mechanism, the combination of two ribbon-drums each provided with a ratchet and a pawl for actuating the same by the letter-spacing mechanism of the machine, with a pinion geared to each drum, and mechanism actuated by each pinion for alternately disengaging one of the pawls from its ratchet while the other is being engaged, substantially as described.

3. In an ink-ribbon-feed mechanism, the combination of two ribbon-drums between which the ribbon extends, and two pawls and ratchets for rotating the drums by the letter-spacing mechanism of the machine, with a pivoted arm for each pawl held by friction in any position and adapted to establish and break operative connection between the pawl and ratchet, and a pinion moved by each drum for alternately actuating one of these arms to move in one position while the other is being moved to the other position, substantially as described.

4. In an ink-ribbon mechanism for typewriters, the combination of two ribbon-drums and a pawl and ratchet for each drum for actuating the same step by step by the letter-spacing mechanism of the machine, with a pivoted arm extending over each pawl, adapted to lock the latter out of engagement with its ratchet and to release the same into operative relation to said ratchet, a spring for holding the arm in either of its two positions, and mechanism actuated by each ribbon-drum for shifting the pivoted arms alternately, substantially as described.

5. In an ink-ribbon mechanism for typewriters, the combination of two rotary ribbon-drums adapted to move longitudinally in their bearings, and automatic mechanism for feeding the ribbon from one drum to the other, with mechanism for reversing the feed automatically, and a worm locked against lateral movement and connected by tongue and groove with the shaft of each drum for actuating the reversing mechanism, whereby the ink-ribbon is shifted laterally at will without disturbing its automatic feed and reversal, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES F. McLAUGHLIN.

Witnesses:
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MYER COHEN.