Nov. 24, 1964 J. W. CARLSON 3,158,093

PRINTING DEVICES

Filed Aug. 8, 1961 3 Sheets-Sheet 1

FIG. 1

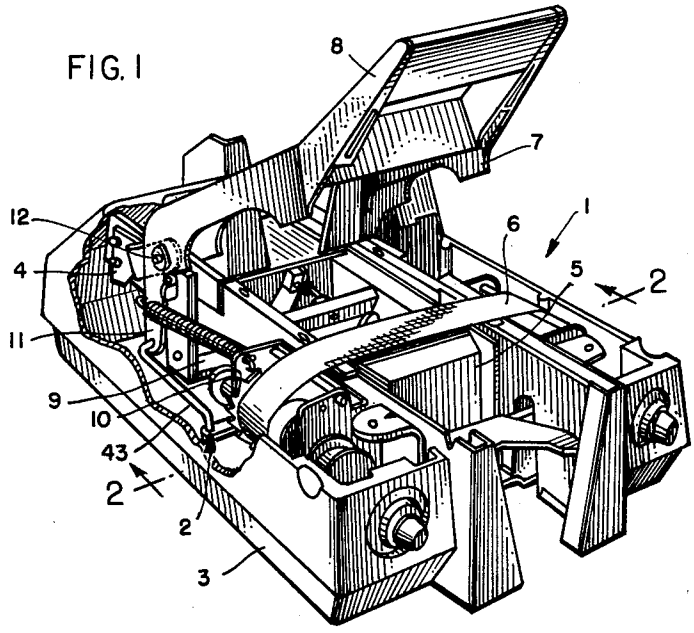
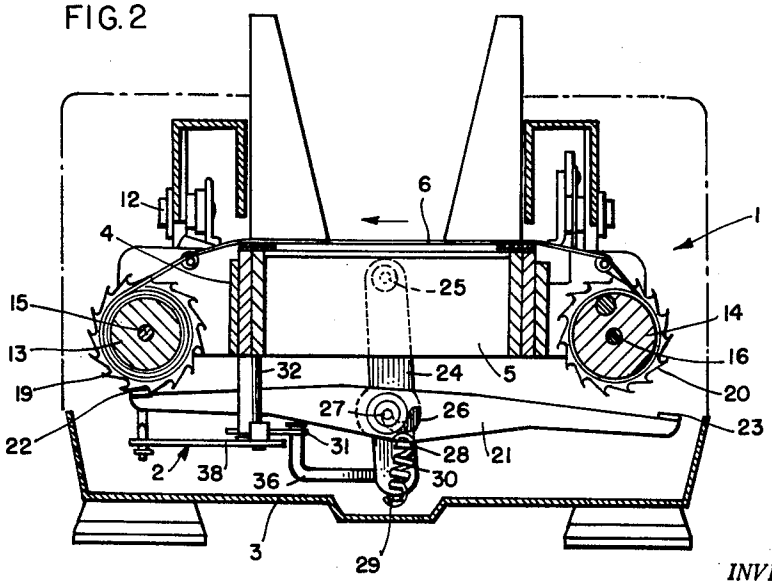


FIG. 2



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FIG. 3

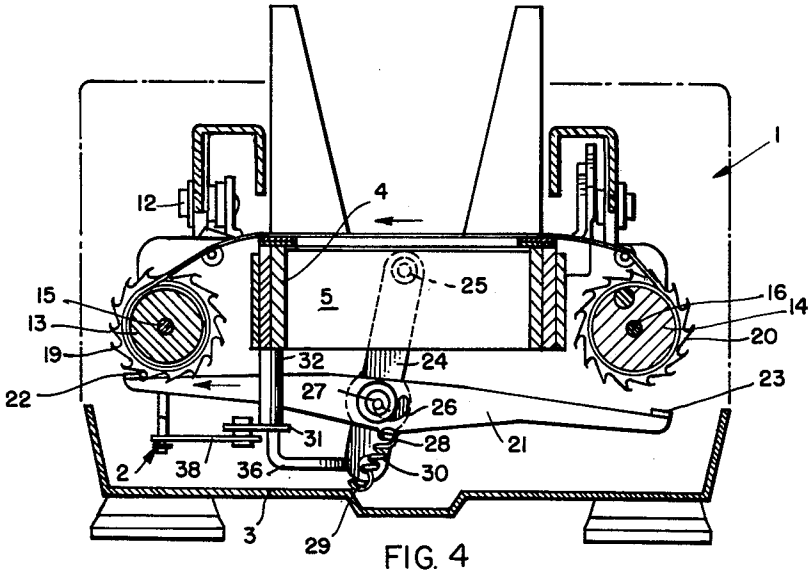
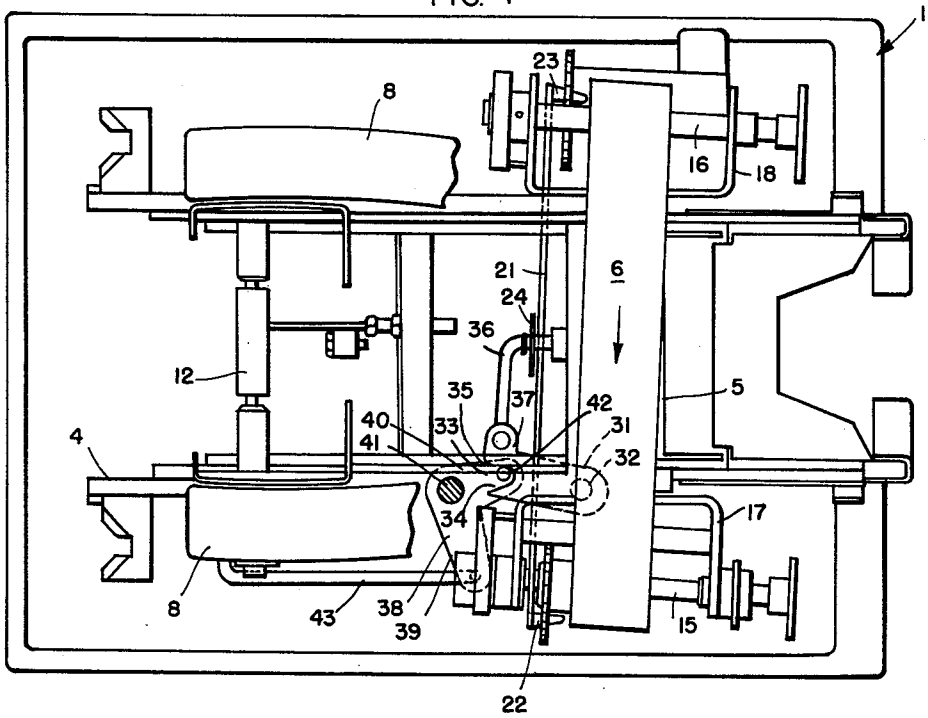


FIG. 4



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PRINTING DEVICES

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FIG. 5

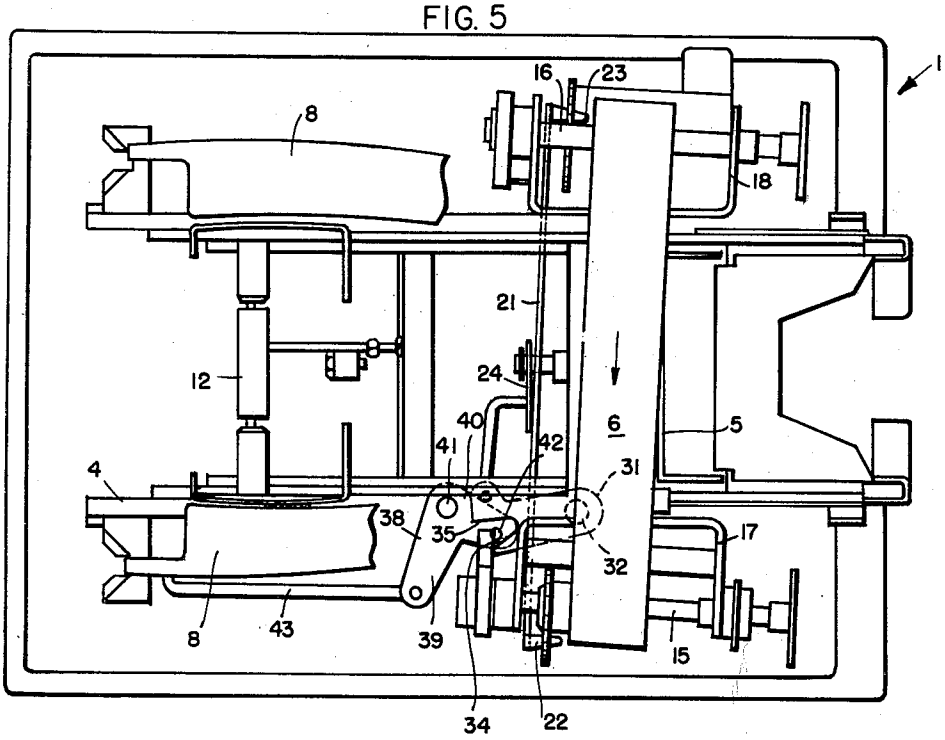
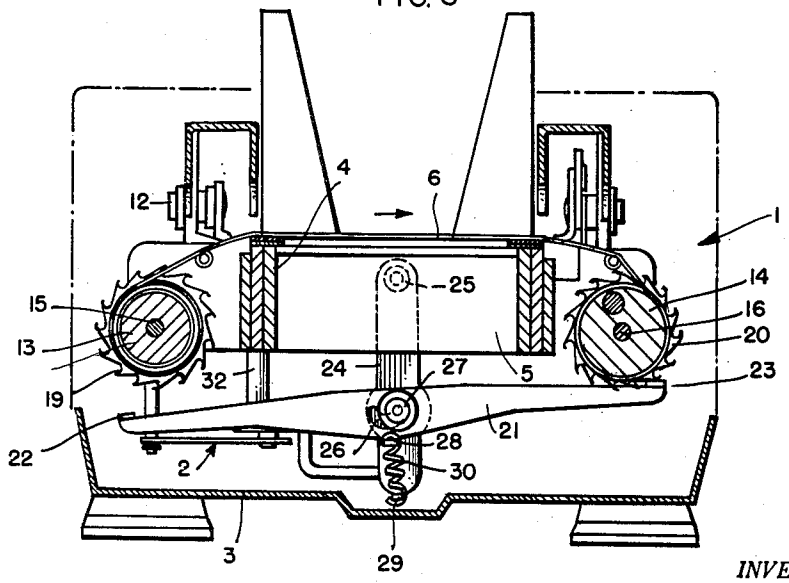


FIG. 6



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United States Patent Office 3,158,093 Patented Nov. 24, 1964

3,158,093

PRINTING DEVICES

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Filed Aug. 8, 1961, Ser. No. 130,052
3 Claims. (Cl. 101—310)

This invention relates to printing devices, and, more particularly, to mechanisms particularly well adapted for feeding inked ribbons in printing machines, such as, for example, hand-operated addressing machines, and the like.

It is a primary object of the present invention to provide a novel mechanism for feeding an inked ribbon through printing machines, and the like.

Mechanisms for feeding inked ribbons through hand-operated printing machines, and the like, have been heretofore known in the art. However, such mechanisms have heretofore commonly had several inherent disadvantages such as, for example, being complicated in construction or operation; being large and cumbersome in size; not holding the ribbon stationary during an actual printing operation; or not being readily and economically producible commercially, and the like. It is an important object of the present invention to overcome such disadvantages.

Another object of the present invention is to afford a novel mechanism for feeding inked ribbons, and the like, through a printing machine in a novel and expeditious manner.

Another object is to afford novel mechanism of the aforementioned type wherein the parts are constituted and arranged in a novel and expeditious manner whereby the ribbon is advanced in timed relation to the printing operations of the machine in such a manner that the ribbon is disposed in stationary position during the actual printing portion of the operation of the machine.

A further object of the present invention is to afford a novel mechanism of the aforementioned type which is practical and efficient in operation and may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a fragmentary front perspective view of a portion of a hand-operated addressing machine, including ribbon-feeding mechanism, embodying the principles of the present invention;

FIG. 2 is a fragmentary detail sectional view taken substantially along the line at 2—2 in FIG. 1;

FIG. 3 is a fragmentary detail sectional view similar to FIG. 2, but showing certain parts thereof disposed in different position;

FIG. 4 is a fragmentary detail plan view of a portion of the machine shown in FIG. 1;

FIG. 5 is a fragmentary detail plan view similar to FIG. 4, but showing certain parts in different position; and

FIG. 6 is a fragmentary detail sectional view similar to FIG. 2, but showing certain parts in different operative position.

A hand-operated printing machine 1, including ribbon feeding mechanism 2, embodying the principles of the present invention, is shown in the drawings to illustrate a preferred embodiment of the present invention.

The printing machine 1 includes, in general, a base 3 on which is mounted a supporting frame 4, FIGS. 1 and 2. An anvil 5 is disposed within the supporting frame 4, and an elongated inked ribbon 6 is disposed on and extends across the top of the anvil 5.

A platen 7 is carried by the front free end portion of a platen arm 8, the other end portion of which is pivotally connected to the rear end portion of the supporting frame 4. A tension coil spring 9 has one end portion thereof connected to an outwardly projecting ear 10 on the supporting frame 4, and the other end portion thereof attached to a downwardly projecting ear 11 on the rear end portion of the platen arm 8. The spring 9 is connected to the platen arm 8 in such position that it is effective to normally yieldingly hold the platen arm 8 in a raised, at-rest position, as shown in FIG. 1, wherein the platen 7 is disposed above the anvil 5 in spaced relation thereto. The platen arm 8 is manually pivotable around suitable supporting members such as pins 12 mounted in the rear end portion of the supporting frame 4, from the normal at-rest position shown in FIG. 1, to a lowered printing position, not shown, wherein the platen 7 is effective to press the inked ribbon 6 against the anvil 5. The spring 9 is effective to return the platen arm 8 from printing position to the aforementioned normal at-rest position when the arm 8 is released by the operator in printing position.

Two spools 13 and 14, having rods 15 and 16 extending axially therethrough, respectively, are mounted on opposite sides of the supporting frame 4. The rods 15 and 16 are rotatably mounted in supporting brackets 17 and 18, respectively, attached to, and projecting outwardly from the supporting frame 4. The respective opposite end portions of the inked ribbon 6 are wrapped around and attached to the spools 13 and 14, and the spools 13 and 14 are disposed in position to support the inked ribbon 6 in the aforementioned position on top of the anvil 5. Rotation of the spools 13 and 14 in a counterclockwise direction is effective to move the inked ribbon 6 across the anvil 5 from right to left, as viewed in FIG. 2; and rotation of the spools 13 and 14 in a clockwise direction, is effective to move the inked ribbon 6 across the anvil 5 in from left to right, as viewed in FIG. 2.

Two ratchet wheels 19 and 20 are mounted on and secured to the rear ends of the spools 13 and 14, respectively, for rotation therewith. An elongated lever 21 having two laterally projecting ears 22 and 23 disposed on the respective opposite end portions thereof, is pivotally mounted at its longitudinal center on the lower end portion of an upstanding lever 24. The upper end portion of the lever 24 is pivotably secured to the rear face of the anvil 5 by suitable means such as a pin 25, FIG. 2, and the lever 21 is disposed forwardly of the lever 24 below the pin 25. The lever 21 has an elongated, substantially semi-circular shaped slot 26 extending through the longitudinal central portion thereof. The slot 26 is so disposed in the lever 21, that the arc of the aforementioned semi-circle, opens generally upwardly, FIG. 2. A pin 27 is mounted in and carried by the lever 24, and projects forwardly through the slot 26 to thereby pivotally mount the lever 21 on the lower end portion of the lever 24.

An ear 28 projects laterally forwardly from the lower edge portion of longitudinal center portion of the lever 21, and another ear 29 projects laterally forwardly from the lower end of the lever 24. A tension coil spring 30 is connected between the ears 28 and 29, in position to yieldingly urge the lever 21 downwardly, to thereby normally maintain the pin 27 in engagement with the upper portion of the slot 26.

When the pin 27 is disposed in the left-hand portion of the slot 26, as shown in FIG. 2, the spring 30 is effective to yieldingly urge the lever 21 to rotate in a clockwise direction, as viewed in FIG. 2. The lever 21 is disposed in such position relative to the ratchet wheels 19 and 20, that when the lever 21 is urged in the aforementioned clockwise direction, the ear 22 is yieldingly held in engagement with the outer periphery of the ratchet wheel 19, and the ear 23 is held in downwardly spaced relation to the ratchet wheel 20, as shown in FIG. 2.

When the pin 27 is disposed in the right end of the slot 26, as shown in FIG. 6, the tension coil spring 30 is disposed in position to yieldingly urge the lever 21 to rotate in a counterclockwise direction, as viewed in FIG. 6. The lever 21 is so disposed relative to the ratchet wheels 19 and 20, that when the lever 21 is urged to rotate in this last-mentioned direction, the spring 30 is effective to yieldingly hold the ear 23 in engagement with the outer periphery of the ratchet wheel 20, and the ear 22 is held in downwardly spaced relation to the ratchet wheel 19, as shown in FIG. 6.

From the foregoing it will be seen that with the lever 21 disposed in the position shown in FIG. 2, when the lever 24 is oscillated around the pin 25 to thereby longitudinally reciprocate the lever 21, the latter is effective to rotate the spool 13 in a counterclockwise direction, as viewed in FIG. 2, to thereby move the ribbon 6 to the left as viewed in FIG. 2; and, when the lever 21 is disposed in the position shown in FIG. 6, oscillation of the lever 24 around the pin 25 is effective to reciprocate the lever 21 longitudinally and thereby rotate the spool 14 in a clockwise direction, as viewed in FIG. 2, to thereby move the inked ribbon 6 across the anvil 5 from left to right, as viewed in FIG. 6.

The reversing mechanism 21–24 of the ribbon feed mechanism 2 may be of any suitable type, but, preferably, is of the type shown herein, and which is described in greater detail in my co-pending application for United States Letters Patent, Serial No. 130,071, filed August 8, 1961. In the reversing mechanism 21–24, as shown in the drawings hereof, when the supply of inked ribbon 6 is exhausted from either one of the spools 13 or 14, the lever 21 is, of course, ineffective to rotate the spools 13 and 14 during the next oscillation of the lever 24, so that the movement of the lever 24 is effective to move the pin 27 to the other end of the slot 26 in the lever 21. This movement of the pin 27 to the other end of the slot 26 is effective to cause the lever 21 to tilt to the other of the two operative positions shown in FIGS. 2 and 6, to thereby reverse the operation of the ribbon feeding mechanism and cause the ribbon 6 to be fed unto the spool from which it has become exhausted.

In the printing machine 1, oscillation of the lever 24 and, therefore, longitudinal reciprocation of the lever 21, is effected in timed relation to oscillation of the platen arm 8 around the rod 12, between the normal at-rest position shown in FIG. 1, and the aforementioned lowered printing position. To accomplish this, the lever 24 is operatively connected to the rear end portion of the platen arm lever 8 by mechanism which will now be described.

This mechanism includes an elongated lever 31, FIGS. 2, 3, and 4, which is rotatably mounted on the lower end portion of a post 32 which is secured to and projects downwardly from the frame 4 below the rear edge portion of the anvil 5. The lever 31 projects rearwardly from the post 32 and has a rearwardly opening slot 33, defined by two rearwardly diverging side walls 34 and 35, in the rear end portion thereof, FIGS. 4 and 5. An elongated link 36 has one end portion extending into and pivotally attached to the lower end portion of the lever 24, below the lever 21, FIGS. 2, 3, and 4, and the other end portion extending into and pivotally attached to an ear 37 projecting laterally from the lever 31.

A bell crank lever 38, having two arms 39 and 40 is rotatably mounted on the lower end portion of another post 41, which is similar to the post 32, and is attached

to and projects downwardly from the frame 4 rearwardly of the post 32, FIGS. 2, 3, and 4. The bell crank lever 38 is disposed rearwardly of the lever 31, and a pin 42 is carried by and projects upwardly from the free end portion of the arm 40 thereof. The pin 42 projects upwardly into the slot 33 in the lever 31 in such position that the bell crank lever 38 is effective through the pin and slot connection 42–33 between it and the lever 31 to rotate the lever 31 in a counterclockwise direction when the bell crank lever 38 rotates in a clockwise direction, and to rotate the lever 31 in a clockwise direction when the bell crank lever 38 rotates in a counterclockwise direction, as viewed in FIG. 4.

An elongated link 43 has one end mounted in and pivotally attached to the free end portion of the arm 39 of the bell crank lever 38, FIGS. 2, 3, and 4 and the other end portion mounted in and pivotally attached to the ear 11 projecting downwardly from the rear end portion of the platen arm 8, FIG.1. The link 43 is so constituted and arranged in the printing machine 1, that when the platen arm 8 is disposed in normal at-rest position shown in FIG. 1, the link 43 is disposed in the position, and is effective to hold the bell crank 38 in the position, shown in FIG. 4; and when the platen arm 8 is disposed in the aforementioned lowered printing position, the link 43 is disposed in the position, and is effective to hold the bell crank lever 38 in the position, shown in FIG. 5. Oscillation of the platen arm 8 between the normal at-rest position and the aforementioned printing position is effective to longitudinally reciprocate the link 43 between the positions shown in FIGS. 4 and 5, and thereby oscillate the bell crank lever 38 between the positions shown in FIGS. 4 and 5. The aforementioned oscillation of the bell crank lever 38 is effective to oscillate the lever 31, and reciprocate the link 36, between the positions thereof shown in FIGS. 4 and 5, to thereby oscillate the lever 24 between the positions shown in FIGS. 2 and 3.

During initial movement of the bell crank lever 38 from the position shown in FIG. 4, toward the position shown in FIG. 5, the pin 42 is engaged with the side wall 34 and moves outwardly theretoward to thereby operatively press thereagainst and cause the lever 31 to rotate in a counterclockwise direction, as viewed in FIG. 4. The side wall 34 is so constituted and arranged in the lever 31, and the levers 31 and 38 are so disposed relative to each other, that during the last few degrees of rotation of the platen arm 8 from normal at-rest position into the aforementioned lowered printing position, the pin 42 does not move toward the side wall 34 but moves along the outer end portion thereof. Thus, it will be seen that during the final movement of the platen arm 8 into printing position, the lever 31, the link 36, and the levers 24 and 21 are disposed in stationary position so that they are ineffective to rotate the spools 13 and 14, and the inked ribbon 6 is, therefore, held in stationary position on the anvil 5. Hence, it will be seen that when the platen 7 moves into actual printing position, the ribbon 6 is stationary so that blurring or offsetting of the printing will not occur because of movement of the ribbon 6.

In the operation of the printing machine 1, when the pin 27 on the lever 24 is disposed in the left-end of the slot 26, as shown in FIG. 2, the elongated lever 21 is tilted up to the left to thereby engage the ear 22 with the sprocket wheel 19, as shown in FIGS. 2 and 3. With the parts of the printing machine so constituted and arranged, as the platen arm 8 moves downwardly from the normal at-rest position shown in FIG. 1 toward the aforementioned lowered printing position, the lever 24 is swung outwardly from the normal at-rest position shown in FIG. 2 to the fully actuated position shown in FIG. 3, as the pin 42 on the bell crank lever 38 moves outwardly along the side wall 34 of the slot 33 in the lever 31. This movement of the lever 24 is effective to move the lever 21 longitudinally from the position shown in FIG. 2 into the position shown in FIG. 3, wherein the ear 22 is dis-

posed in operative engagement with the next tooth on the ratchet wheel 19. Thereafter, movement of the lever 31 from the position shown in FIG. 5 back to the position shown in FIG. 4, effected by the movement of the platen arm 8 from the printing position back to normal at-rest position shown in FIG. 1, as previously described, is effective to swing the lever 24 from the fully actuated position shown in FIG. 3 to the normal at-rest position shown in FIG. 2 to thereby move the elongated lever 21 longitudinally to the right, as viewed in FIGS. 2 and 3. Such return movement of the lever 21 from the position shown in FIG. 3 to the position shown in FIG. 2 is effective to rotate the spool 13 in a counterclockwise direction, as viewed in FIGS. 2 and 3, to thereby advance the inked ribbon 6 from the spool 14 across the anvil 5 to the left toward the spool 13.

During movement of the lever 21 from the position shown in FIG. 2 to the position shown in FIG. 3, while the platen arm 8 is moving downwardly, the ear 22 rides over the teeth on the periphery of the ratchet wheel 19, and the ribbon drive mechanism 2 is ineffective to advance the ribbon 6 across the anvil 5. During the initial movement of the platen arm 8 upwardly away from the aforementioned lowered printing position, the pin 42 on the bell crank lever 38 moves inwardly along the side wall 34, and it is not until the pin 42 moves into engagement with the side wall 35 that the counterclockwise rotation of the bell crank lever 38 is effective to rotate the lever 31. Thus, it will be seen that when the lever 31 is disposed on the lever 24 in the position shown in FIGS. 2 and 3, wherein the pin 27 is disposed in the left end of the slot 26 and the ribbon feed mechanism 2 is effective to feed the ribbon to the left across the anvil 5, as viewed in FIGS. 2 and 3, the ribbon 6 remains stationary during all movement of the platen arm 8, until the platen has moved upwardly away from the anvil 5.

When the pin 27 is disposed in the right end of the slot 26, as shown in FIG. 6, so that the right end of the lever 21 is tilted upwardly into engagement with the sprocket wheel 20 on the spool 14, the ear 23 is disposed in operative engagement with a tooth on the sprocket wheel 20 when the lever 21 and the lever 24 are disposed in the normal at-rest position shown in FIG. 6. Thus, when the lever 24 is swung in a clockwise direction around the pin 25 by movement of the platen arm 8 from normal at-rest position shown in FIG. 1 to the aforementioned lowered printing position the consequent movement of the lever 21 longitudinally to the left is effective to rotate the sprocket wheel 20 and, therefore, the spool 14 is in a clockwise direction. This rotation of the spool 14 is effective to move the inked ribbon 6 to the right across the anvil 5, as viewed in FIG. 6, from the spool 13, toward the spool 14. However, it will be remembered that during the last few degrees of rotation of the platen arm 8, from the normal at-rest position toward the printing position, the bell crank lever 38 is ineffective to rotate the lever 31, so that the levers 24 and 21 remain stationary, and are ineffective to rotate the spool 14. Hence, the inked ribbon 6 is also disposed in stationary position, when the platen 7 is disposed in actual printing position, during this last-described operation of the printing machine 1.

When the lever 21 is disposed on the lever 24 in this last-mentioned position, the return movement of the platen arm 8 from printing position toward normal position is initially ineffective to rotate the lever 31, the pin 42 during the initial return movement of the platen arm 8, moving inwardly along the side wall 34 and across to the side wall 35. After the pin 42 moves into engagement with the side wall 35 during such return movement of the platen arm 8, the rotation of the bell crank lever 38 effected by the continued rotation of the platen arm 8 is effective to return the lever 31 from the position shown in FIG. 5, to the position shown in FIG. 4. This rotation of the level 31 is effective to again move the lever 24 back into the normal position shown in FIG. 6 and

thereby move the ear 23 on the lever 21 into operative engagement with the next tooth on the ratchet wheel 20.

From the foregoing, it will be seen that my novel inked ribbon drive mechanism 2 disclosed herein affords a novel and practical ribbon drive mechanism during the operation of which it is assured that the inked ribbon is held stationary during an actual printing operation.

Also, it will be seen that the present invention affords a ribbon drive mechanism which is relatively small and compact in size.

In addition, it will be seen that the present invention affords a novel ribbon feed mechanism which is practical and efficient in operation and may be readily and economically produced commercially.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alternations as fall within the purview of the following claims.

I claim:

1. In a printing mechanism including supporting means, a platen arm pivotally mounted on supporting means for oscillation between a printing position and a normal at-rest position, an inked ribbon extending across said printing position, two spools rotatably supported by said supporting means in substantially parallel relation to each other, said ribbon being wrapped on said spools and supported thereby, each of said spools having a ratchet wheel thereon, and an elongated lever selectively operatively engageable with said ratchet wheels and reciprocable longitudinally to thereby rotate said ratchet wheels and spools and thereby move said inked ribbon across said printing position, means for so reciprocating said lever and thereby rotate said spools in timed relation to said oscillation of said platen arm, said last-mentioned means including another lever pivotally mounted on said supporting means for oscillation through a predetermined path of movement, a link operatively connecting said other lever to said elongated lever in position to so reciprocate said elongated lever upon said oscillation of said other lever, said other lever having an elongated slot therein, and linkage means, said linkage means including a link operatively connected to said platen arm for movement thereby during said oscillation of said platen arm, and a third lever operatively connected to said last mentioned link for movement thereby during said movement of said last mentioned link, said third lever including a member operatively disposed in said slot in position to so oscillate said other lever during all of said oscillation of said platen arm except for a fractional portion of said last mentioned oscillation at one end thereof.

2. In a printing mechanism including supporting means, a platen arm pivotally mounted on supporting means for oscillation between a printing position and a normal at-rest position, an inked ribbon extending across said printing position, two spools rotatably supported by said supporting means in substantially parallel relation to each other, said ribbon being wrapped on said spools and supported thereby each of said spools having a ratchet wheel thereon, and an elongated lever selectively operatively engageable with said ratchet wheels and reciprocable longitudinally to thereby rotate said ratchet wheels and spools and thereby move said inked ribbon across said printing position, means for so reciprocating said lever and thereby rotate said spools in timed relation to said oscillation of said platen arm, said last-mentioned means including another lever operatively connected to said elongated lever and pivotally mounted on said supporting means for oscillation through a predetermined path of movement for thereby so reciprocating said elongated lever, said other lever having two side wall portions defining an elongated slot therein, a third lever pivotally mounted on said supporting means and oscillatable

through a predetermined path of travel thereon, said third lever having a pin thereon disposed in said slot in position to operatively engage said side walls in position to oscillate said other lever through said path of movement during all such oscillation of said third lever through said path of travel excepting a fractional portion thereof on both sides of one end of said path of movement of said third lever, and an elongated link operatively connecting said third lever to said platen arm for oscillation through said last-mentioned path of movement during said oscillation of said platen arm, said third lever being disposed at said one end of said path of travel thereof when said platen arm is disposed in said printing position.

3. In a printing mechanism including supporting means, a platen arm pivotally mounted on supporting means for oscillation between a printing position and a normal at-rest position, an inked ribbon extending across said printing position, two spools rotatably supported by said supporting means in substantially parallel relation to each other, said ribbon being wrapped on said spools and supported thereby each of said spools having a ratchet wheel thereon, and an elongated lever selectively operatively engageable with said ratchet wheels and reciprocable longitudinally to thereby rotate said ratchet wheels and spools and thereby move said inked ribbon across said printing position, means for so reciprocating said lever and thereby rotate said spools in timed relation to said oscillation of said platen arm, said last-mentioned means including another lever having a portion operatively connected to said elongated lever and pivotally mounted on said supporting means for oscillation through a predetermined path of movement for thereby so reciprocating said elongated lever, said other lever having two side wall portions defining an elongated slot in another portion thereof, a third lever pivotally mounted on said supporting means and oscillatable through a predetermined path of travel thereon, said third lever having a pin thereon disposed in said slot in position to operatively engage said side walls in position to oscillate said other lever through said path of movement during said oscillation of said third lever through said path of travel, said side walls and said pin being disposed in such position relative to each other that during final movement of said third lever at one end portion of said path of travel thereof said pin moves along one of said side walls in position ineffective to move said other lever, and during other portions of said movement of said third lever along said path of travel said pin moves transversely to said side walls in a direction effective to push said other lever along said path of movement, and a link operatively connecting said third lever to said platen arm for said oscillation thereby during said oscillation of said platen arm, said third lever being so connected to said platen arm that said third lever is disposed at said one end of said path of travel thereof when said platen arm is disposed in said printing position.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,158,093 November 24, 1964

John W. Carlson

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 1 to 3, for "John W. Carlson, of Chicago, Illinois, read -- John W. Carlson, of Chicago, Illinois, assignor to Speed-O-Print Business Machine Coropration, of Chicago, Illinois, a corporation of Illinois, --; line 12, for "John W. Carlson, his heirs" read -- Speed-O-Print Business Machine Corporation, its successors --; in the heading to the printed specification, line 3, for "John W. Carlson, 5625 N. Kolmar Ave., Chicago 30, Ill." read -- John W. Carlson, Chicago, Ill., assignor to Speed-O-Print Business Machine Corporation, Chicago, Ill., a corporation of Illinois --.

Signed and sealed this 10th day of August 1965.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents