Dec. 22, 1936. M. E. BRENDEL 2,065,362

RECORDING APPARATUS

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FIG. 1

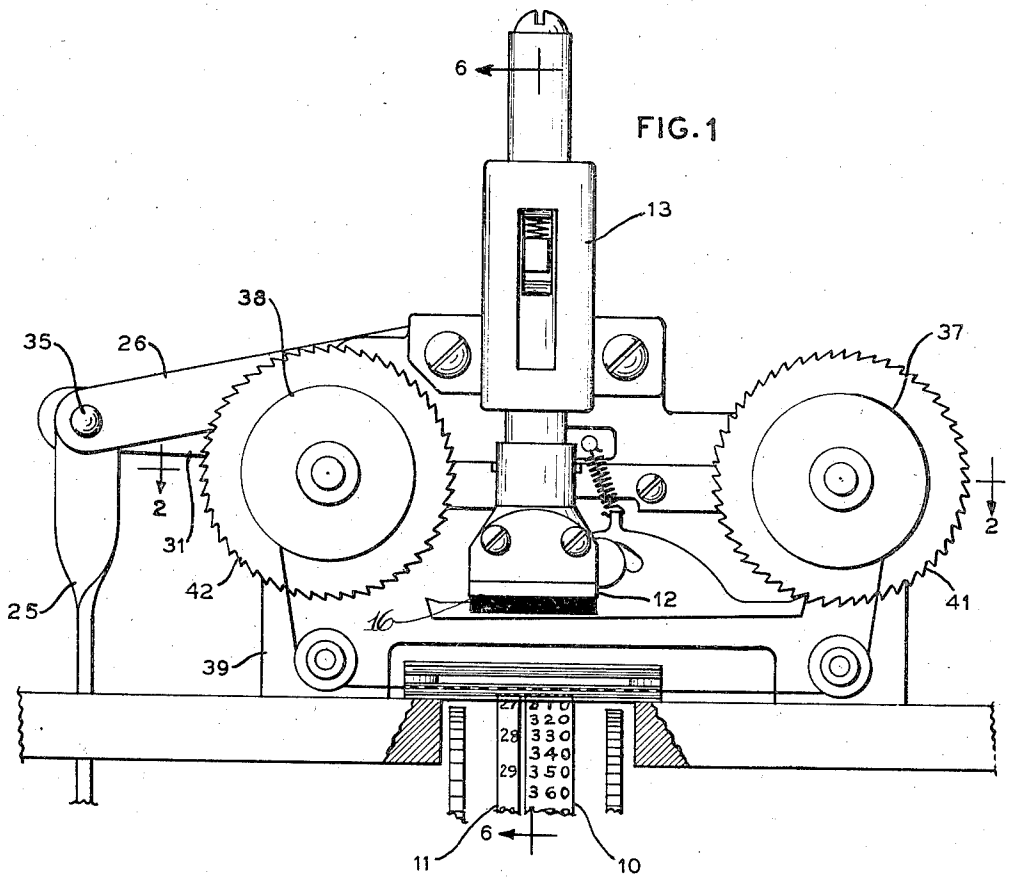

FIG. 2

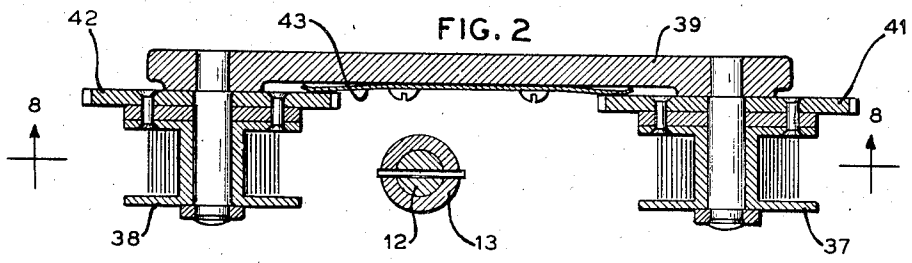

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FIG. 3

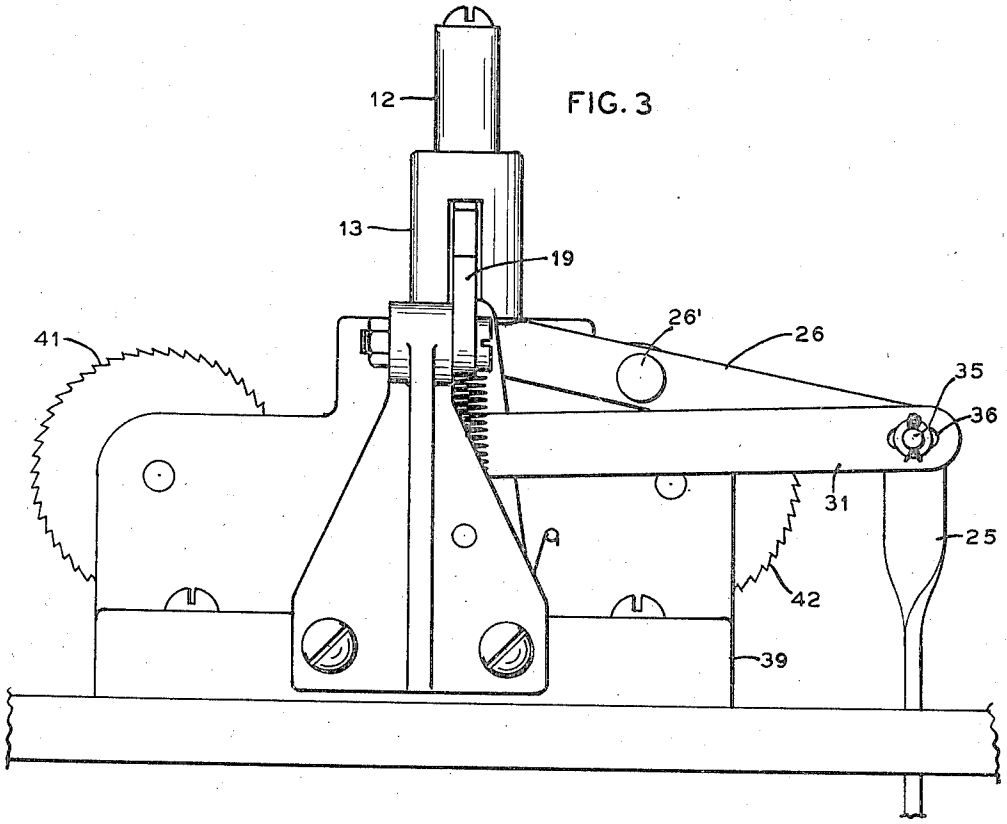

FIG. 4

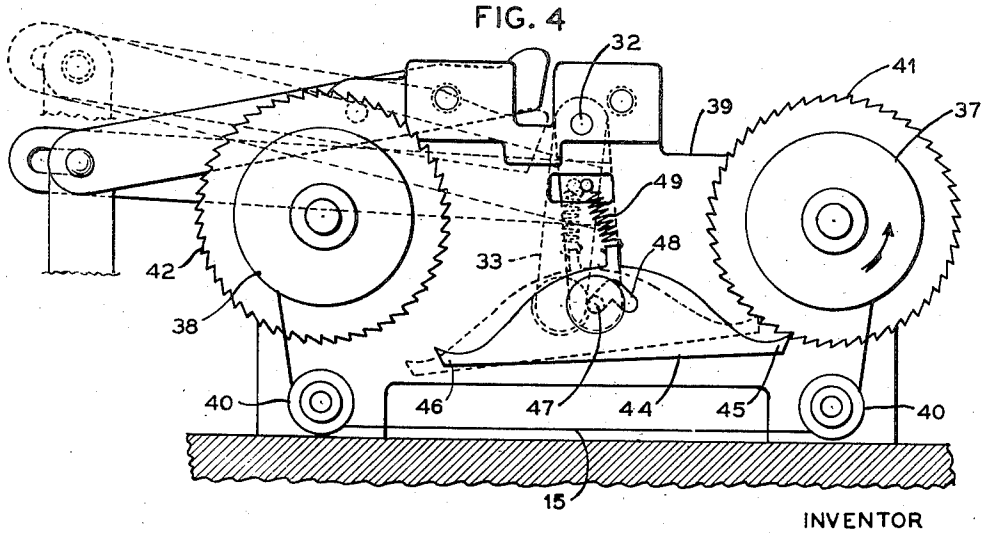

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FIG. 5

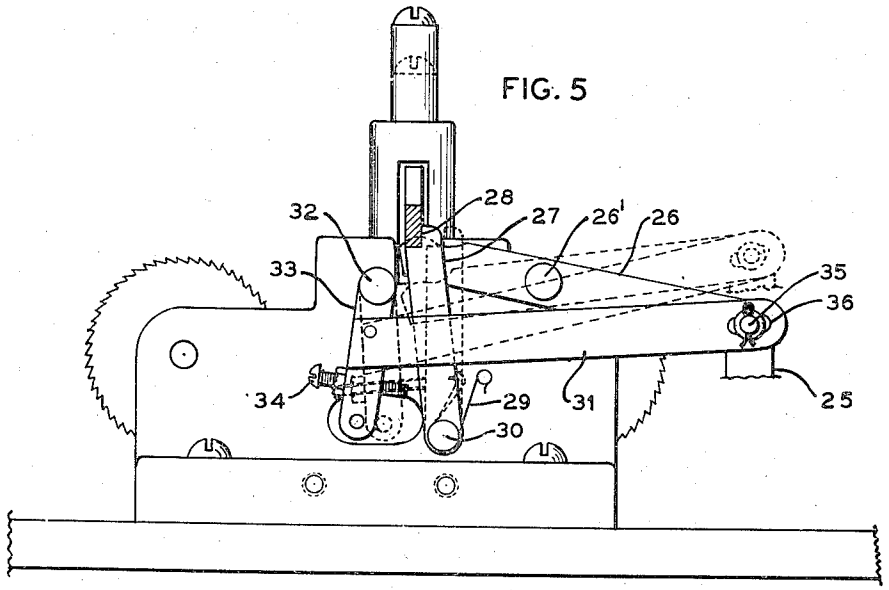

FIG. 6

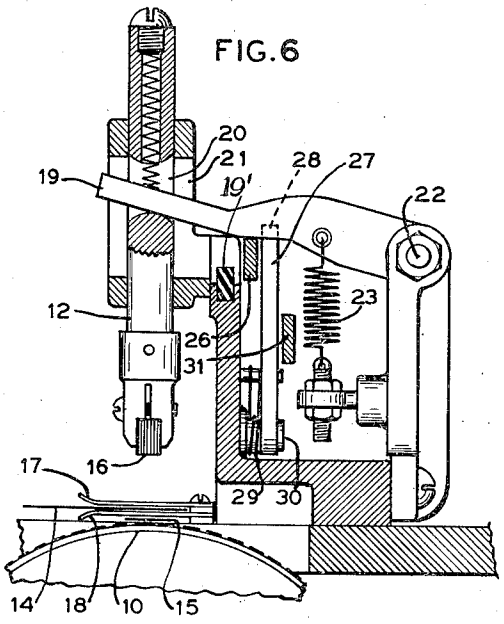

FIG. 7

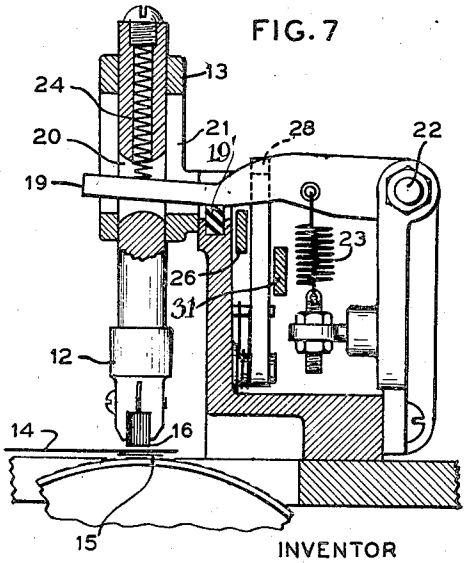

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FIG. 8

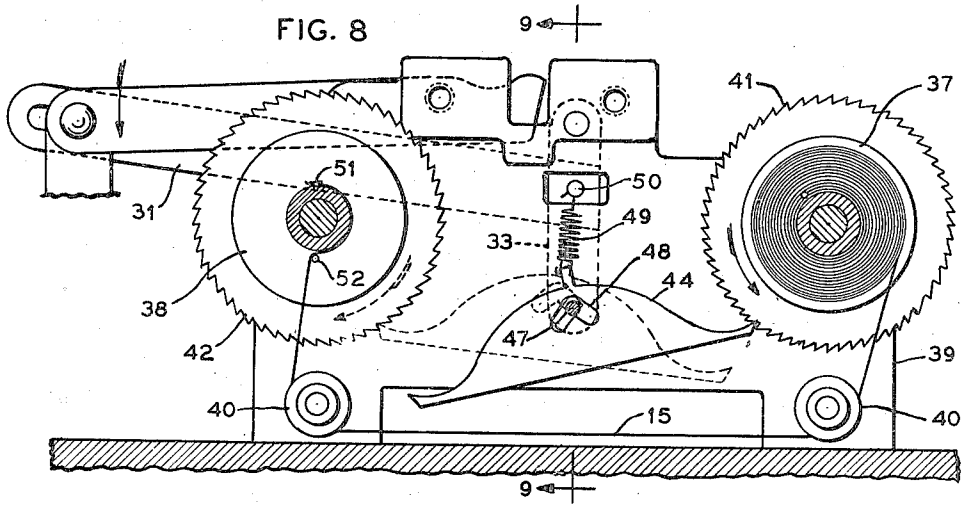
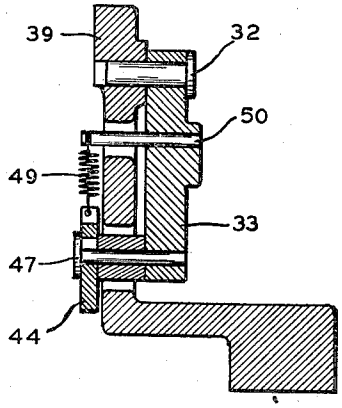


FIG. 9



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Patented Dec. 22, 1936 2,065,362

UNITED STATES PATENT OFFICE

2,065,362

RECORDING APPARATUS

Max E. Brendel, Chicago, Ill., assignor to Streeter-Amet Company, Chicago, Ill., a corporation of Illinois

Application October 29, 1932, Serial No. 640,224

4 Claims. (Cl. 101—336)

This invention relates to printing and ribbon actuating mechanism for recording apparatus, and among other objects aims to provide a simple and efficient mechanism for printing and for controlling the ribbon feed.

The nature of the invention may be readily understood by reference to one illustrative construction embodying the same and shown in the accompanying drawings.

In said drawings:

Fig. 1 is a front elevation of the apparatus;

Fig. 2 is a plan section thereof taken on the plane 2—2 of Fig. 1;

Fig. 3 is a rear elevation of the apparatus;

Fig. 4 is a partial elevation taken from the front of the machine showing the ribbon feeding and reversing mechanism;

Fig. 5 is a partial elevation taken from the rear of the machine showing the actuating levers;

Fig. 6 is a vertical section taken on the plane 6—6 of Fig. 1 showing the printing hammer held in elevated position;

Fig. 7 is a similar view showing the printing hammer just after it has made the printing impression;

Fig. 8 is a vertical section taken on the plane 8—8 of Fig. 2 showing the ribbon feeding mechanism at the point of reversing the direction of ribbon feed; and

Fig. 9 is a transverse section taken on the plane 9—9 of Fig. 8 of the ribbon feeding pawl and associated parts.

The illustrative apparatus is here shown arranged for printing records from cylindrical type wheels 10 and 11 which may be rotated to bring appropriate data to recording position where the data is printed on a record sheet, tape, card or the like. For example, type or printing wheels of this character may be used for indicating weights on scales as shown in my co-pending application Serial No. 632,351, and the illustrative printing apparatus may be associated therewith as indicated in said application, for printing such weights on records and the like.

The movable printing platen represented by the printing hammer 12, is mounted for vertical reciprocation in a guide 13 and is adapted to make a record by impressing the record sheet here represented by card 14 upon the type and an interposed printing ribbon 15. The head of the hammer is faced with an appropriate percussion pad 16 slightly yielding in character and delivers a quick or percussive blow to the record adequate to cause the type to print upon the under face of the record, the ink being furnished in this case by the interposed ribbon 15. The percussive action of the hammer makes it possible, if desired, to imprint a number of carbon copies. The character of record may of course vary greatly as well as the character of printing devices which carry the type. The card 14 which here typifies the record, is shown held for printing purposes between guides 17 and 18, from which it may be withdrawn after the impression has been made.

The hammer is here shown energized by an operating lever 19 whose extremity is connected to the former by passing through appropriate slots 20 and 21 in the hammer and its guide respectively. The lever is pivoted at 22 and is actuated by tension spring 23 which is energized upon the raising of the hammer and delivers its energy thereto when the hammer is released. After the impression, the hammer is immediately raised out of contact with the record (to avoid smearing the same or obliterating the printed impression) by a rebound spring 24 mounted inside the bore of the hammer and acting against the lever 19 to raise the hammer. The slot 20 in the hammer allows sufficient clearance to permit it to move downward under the momentum delivered thereto by the lever 19, to make the impression,—after which the spring 24, which has been slightly compressed, serves to raise the hammer and hold it out of further contact with the record. As shown in Fig. 7, the lever 19 encounters a cushioning material 19' at the lower end of its movement which eliminates jar and noise.

In the present instance the hammer is raised to energize the spring on the downward movement of an operating link 25 and is released to deliver its percussive blow to make the impression upon the upward travel of operating link 25. The latter is operatively connected to the hammer lever 19 through lever 26 pivoted at 26' having its free extremity extending underneath lever 19 (see Fig. 6). The upper limits of travel of lever and link are indicated in dotted lines in Figs. 4 and 5. When the lever 19 is thus raised to the position shown in Figs. 5 and 6, it is there held by a holding pawl 27 whose shouldered upper end 28 passes under lever 19 and prevents its downward movement under the pull of spring 23. The pawl is urged toward lever 19 by a torsion spring 29 which embraces the pin 30 on which the pawl is pivoted.

The hammer is released on the aforesaid upward movement of link 25, by a lever 31 actuated by link 25 and pivoted at 32 on the main casting of the apparatus. The lever is here shown

formed with a T-shaped extremity provided by transversely extending member 33 rigidly connected to the lever, one end of said extremity extending to the pivot 32, and the portion opposite carrying a pawl tripping element in the form of an adjustable screw 34 whose extremity engages the pawl and moves it back to clear lever 19 and allow the hammer to act (see dotted line position in Fig. 5). The upward movement of link 25 which finally trips the hammer, simultaneously depresses the extremity of lever 26 so that it is not struck by the downward movement of lever 19. Levers 26 and 31 are here connected through the same pivot pin 35 to link 25,—lever 31 having a more remote pivot point than lever 26 is slotted at 36 to allow the play necessary by reason of the difference in length about the radii through which the levers swing.

Link 25 may obviously be actuated by any appropriate mechanism. Preferably it is lowered by a spring which is energized when the link is raised. Hence, the printing mechanism may be energized for a complete cycle merely by movement of the lever to trip the raising hammer by the reverse movement of the link occurring automatically after the link has been released.

The ribbon feeding mechanism is here shown in the form of a pair of ribbon spools 37 and 38, one of which winds the ribbon as it is unwound from the other. The spools are here shown rotatably mounted on the main casting 39 of the apparatus and the ribbon passes around spaced guide pulleys 40 which serve to hold a length of ribbon in printing position. The ribbon spools are provided respectively with ratchet disks 41 and 42 by means of which they may be respectively rotated. A friction drag in the form of a leaf spring 43 mounted on the casting 39 and bearing against the faces of the ratchets serves to maintain the ribbon taut and to prevent overtravel. The ribbon winding roll is given a step by step movement following successive impressions of the printing hammer, by a pawl 44 whose extremity engages the roll ratchet. The pawl is pivotally mounted on and actuated by the head 33 of lever 31. As here shown pawl 44 is designed to operate each of the ribbon spools 37 and 38 in succession, and is therefore provided at both ends with ratchet engaging extremities 45 and 46. To adapt the pawl to its dual driving capacity, it is made shiftable on its pivot 47 so as to be brought into operating relation with the respective ratchets at the appropriate times. In Fig. 8 the pawl is shown in full lines in engagement with ratchet 41 on spool 37 and in dotted lines in engagement with ratchet 42 on spool 38.

The ribbon drive in the present instance is made reversible and automatically reverses the ribbon travel when one spool has been completely unwound. The pawl is automatically shifted from one spool to the other in this instance through the resistance offered by the ribbon when one spool has been completely unwound. As here shown, the pawl is formed with an inverted V-slot 48 in which its pivot pin 47 operates. The pivot 47 is normally held at one or the other extremities of the slot by a spring 49 connected at one end to the pawl and at the other end to a pin 50 carried by the extremity 33 of lever 31, and the sides of the slot are sufficiently steep so that under the normal reaction of the pawl there is no tendency for the pin 47 to ride up the inclined sides of the slot. When the ribbon becomes completely unwound from the one spool as indicated for example in Fig. 8 (and a reversal of the drive is necessary), the resistance offered by spool 37 to further rotation causes the pivot pin 47 to ride up in slot 48 (because of the resistance of the pawl to further movement toward the spool) against the tension of spring 49. After the pivot pin passes the peak position (shown in Fig. 8), the tension of the spring raises the pawl to bring the pivot pin 47 to the other extremity of slot 48 and tilts it as shown in dotted lines in Fig. 8, the connection of the spring being then shifted to the other side of the pivot center. The reciprocating movement of the pawl then actuates spool 38 in a clockwise direction and unwinds the ribbon from spool 37. The end of the ribbon is advantageously fastened to the spools by anchoring the same at 51 to small teeth at the hub of the spool and then passing the ribbon around a small transverse pin 52 located opposite the teeth. The pin prevents the unwinding of the ribbon from progressing so far as to unhook it from the teeth. To provide additional friction, if necessary, the ribbon may be wrapped an additional turn around the spool but before interposing the pin.

When spool 37 is empty the reverse action takes place and the pivot pin 47 is restored to the other extremity of slot 48 (as shown in Fig. 4) and drive is then shifted to ribbon spool 37. The foregoing ribbon driving and reversing mechanism is of extreme simplicity and does not surround the printing device with complicated and obstruction mechanism.

Obviously the invention is not limited to the details of the illustrative construction since these may be variously modified. Moreover it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention, I claim:

1. In a device of the character described the combination comprising an inking ribbon, a pair of oppositely disposed ribbon rolls having ratchet means by which they may be rotated, a pawl located between said rolls and having its extremities adapted selectively to engage either ratchet means, an oscillating pawl actuator carrying a pawl pivot pin, said pawl having a V-shaped slot in which said pin operates, and a spring connected to the pawl opposite the extremities of the slot to hold said pin resiliently in one or the other extremities of said slot, said spring being adapted to yield under the resistance exerted by the ribbon when one roll is unwound to permit the pin to shift to the other end of the slot to cause the pawl to engage the other roll and reverse the winding of the ribbon.

2. A printing device having a printing hammer and operating means therefor comprising in combination an inking ribbon, a pair of oppositely disposed ribbon rolls having ratchet means by which they may be rotated, a pawl located between said rolls and having its extremities adapted selectively to engage either ratchet means, an oscillating pawl actuator carrying a pawl pivot pin, said actuator being coordinated with the hammer operating means to operate the pawl during the intervals between operations of the hammer, said pawl having a V-shaped slot in which said pin operates, and a spring connected to the pawl opposite the extremities of the slot to hold said pin resiliently in one or the other extremities of said slot, said spring being adapted to yield under the resistance exerted by the rib-

bon when one roll is unwound to permit the pin to shift to the other end of the slot to cause the pawl to engage the other roll and reverse the winding of the ribbon.

3. In a device of the character described the combination comprising an inking ribbon, a pair of ribbon rolls each having a ratchet wheel by which they may be rotated, a pawl member between said ratchet wheels having extremities adapted to engage either ratchet wheel, an oscillating pawl actuating device, means for pivoting said pawl member to said actuating device including a pin on said actuating device and an angular slot in said pawl member for receiving the pin, said slot allowing said pawl to be shifted from engagement with one of said ratchet wheels to engagement with the other, a spring connected to said pawl member opposite the extremities of said slot and said actuating device to press said pawl resiliently against one of said ratchet wheels and to hold said pin in one extremity of said slot, said spring adapted to yield upon resistance to further movement of the pawl member to permit the pin to shift to the other end of the slot to hold the pawl member operatively in engagement with the other ratchet wheel.

4. In a device of the character described the combination comprising an inking ribbon, a pair of ribbon rolls having ratchet means by which they may be rotated, a pivoted pawl member between said ratchet means having extremities adapted to engage either ratchet means, an oscillating pawl actuating device, means for pivoting said pawl member to said actuating device including a pin on said actuating device and an angular slot in said pawl member for receiving the pin, said slot allowing said pawl to be shifted from engagement with one ratchet means to engagement with the other, a spring connected with said pawl opposite the extremities of said slot for resiliently holding the pin in one extremity of the slot, and said spring being adapted to yield upon resistance offered to further movement of the pawl to permit the pawl to shift until the pin lies in the other end of the slot thereby adjusting the pawl to engage the other ratchet means.

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