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RIBBON REINKING DEVICE

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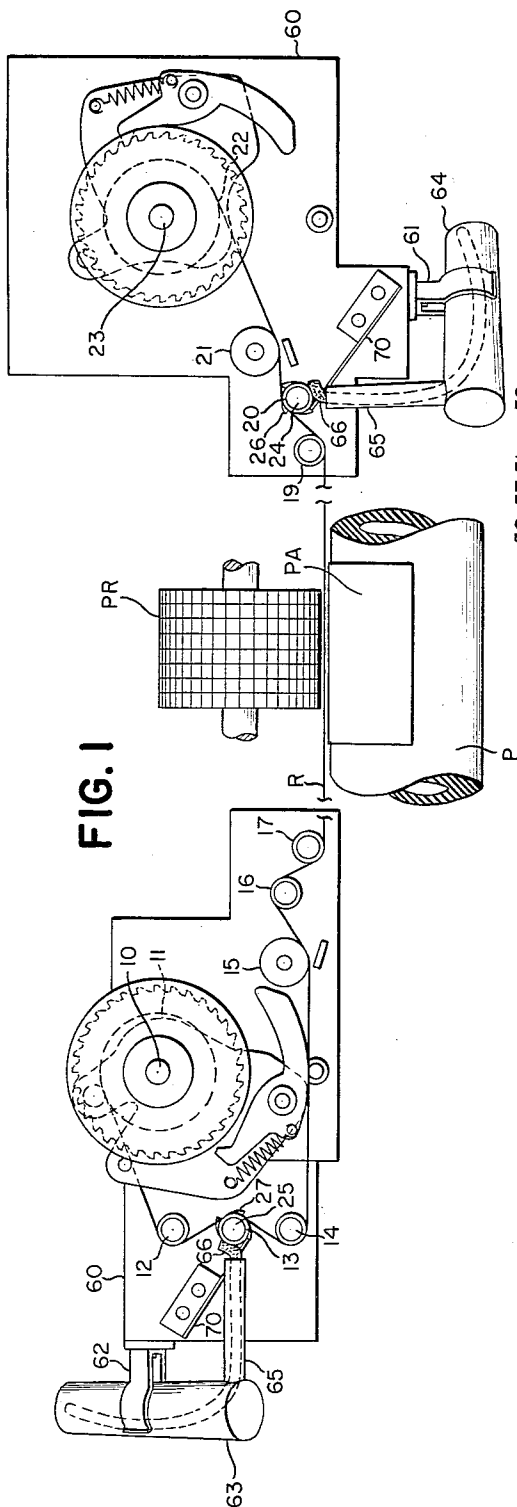


FIG. 1

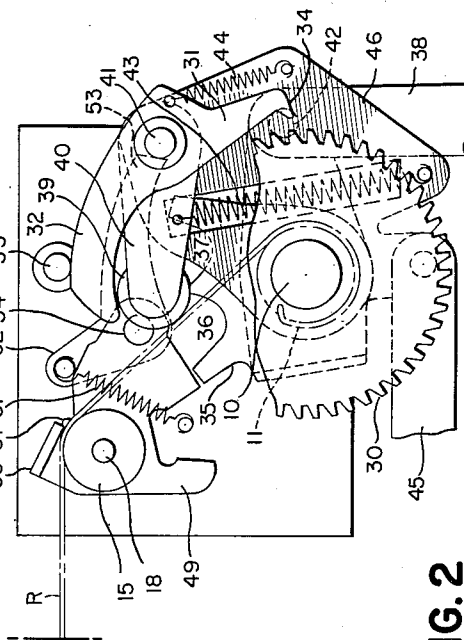


FIG. 2

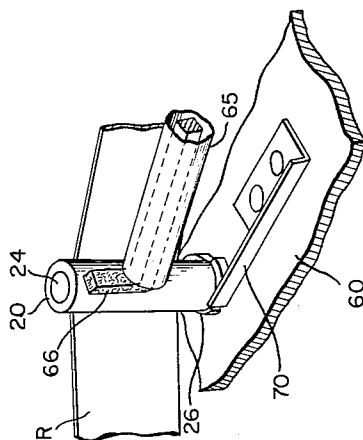


FIG. 3

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RIBBON REINKING DEVICE

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This invention relates generally to ribbon reinking devices and more particularly to means for applying ink to a printing ribbon as it is about to be rewound.

Because of the advances in speed of printing and paper feeding there is need for an arrangement to prevent the inking ribbon cooperating therewith from becoming devoid of ink too rapidly. At ordinary speeds of printing the inking ribbon when rewound had time to get rejuvenated by the gradual transferral of ink from unused areas to other comparatively dry areas. In attempting to overcome such conditions in the past, inking devices had shortcomings due to providing too much ink spasmodically with resulting dark and light printing sections often accompanied with smudging. There was also involved the economical factor of excessive cost in providing elaborate inking devices. In the present instance, excellent results are produced with a minimum of added parts and expense.

An object of the invention is the provision of an improved form of ribbon inking device involving an indirect even application of ink to a ribbon as it is about to be rewound.

Another object of the invention is the provision of a device for applying ink to a unidirectional guide roller which in turn transfers the ink to a ribbon as it is about to be rewound.

Another object of the invention is to provide a reinking device involving an intermediate inking roller which is provided with a ratchet formation and a simple spring detent to prevent it from turning except in the direction to apply the ink when the ribbon is moved away from the printer.

A further object of the invention is the provision of inking wells or capsules and wicks extending therefrom to carry ink to ribbon guide rollers before transferral to a cooperating ribbon moved back and forth across a printer between said rollers. Each inking roller is prevented from rotating when the ribbon is moved therefrom toward the printer. This prevents the ink from being deposited thereon in a way that will cause it to appear fresh while going through the printer and in such a condition as would cause smudging. Instead, the guide roller to which the ink is applied by the wick is allowed to turn only when the ribbon is moving therefrom toward the spool while rewinding and thus the ink continuously deposited by the rotating guide roller is carried along with the ribbon to the end position where it is brought as a spiral film between several layers on the rewound spool and thus caused to be spread and diffused before the ribbon is again withdrawn for use in passing through the printer.

Although the invention is illustrated in connection with an automatic printing machine such as a tabulator, it is understood that the reinking principle is applicable to all other forms of printers employing inking ribbons.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of examples, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a plan view showing the complete path of the inking ribbon between two spools. The ink holders or reservoirs are seen to be in positions to supply ink as the

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ribbon is rewound in either direction after passing between the platen and the printer.

Fig. 2 is a plan view of one portion of a ribbon feeding and reversing mechanism.

Fig. 3 is a perspective view of one inking guide roller with ratcheting parts to allow it to be rotated by the ribbon only in a rewind direction and thus carry the ink applied on the roller by wick into storage between layers of the rewound ribbon on the spool.

In Fig. 1 it is seen that an inking ribbon R is drawn between a printer PR and record receiving sheet PA on a platen P. Starting at the left, the ribbon R is drawn off a spool 11 mounted on a fixed center 10. The ribbon is then wound through a series of guide rollers 12—17 before passing the printer, after which it is again threaded around other guide rollers 19, 20, and 21 before being wound upon the other spool 22 on center 23. Incidentally, the feed spool 11 at the left as shown in Fig. 1, is ordinarily termed "the righthand feed unit" because the machine is usually viewed while looking toward the platen from the printer. This is explained here because hereinafter when reference is made to the showing of the ribbon feed in Fig. 2, that is called the righthand ribbon feed unit.

Before going into detail regarding the application of ink as shown in Fig. 3, it is believed advisable to first consider the mode of feeding and reversing the ribbon in a customary fashion as shown in Fig. 2.

Only one side of the ribbon feed unit is shown in Fig. 2 because the other side is substantially a duplicate of it and an understanding of the feeding and reversing of the ribbon may be gathered with reference to just this half.

The ribbon holding spool 11 is keyed to a spacing ratchet wheel 30 to be turned thereby whenever the wheel is driven by a feed pawl 31.

The ribbon feed unit shown is the righthand unit which is illustrated with the parts ready to be shifted into a position to feed because the ribbon on the related spool is just about exhausted. As long as there was plenty of ribbon on the righthand spool, the left unit did the feeding and the unit shown was ineffective because the feed pawl 31 was so situated circumferentially that even though it swung back and forth it was ineffective because the tail 32 thereon was held depressed by a fixed stud 33 so that the pointed feed end 34 was held away from the teeth of the ribbon spacing ratchet wheel 30.

The reversal of the ribbon feed is caused by a change in the positional relationship between a notched driving member 35 and a driven feed lever 46 connected thereto flexibly through a connector 40 with a roller 39 held in one or the other of the notches 36 or 37 in the driving member 35.

The notched member 35 is loosely pivoted on the ratchet center 10 and is driven positively by link 38 which is articulated thereon at 42 and is reciprocated on every platen space operation of the printer. On every ribbon feed cycle, link 38 is first raised (as seen in Fig. 2) sufficiently to cause reversal when necessary and then it is pulled down to cause feeding, and finally it is raised part-way where it is again brought to the normal position. As the parts are seen in Fig. 2, reversal is taking place from an ineffective to an effective condition which is caused by the lifting of link 38 and a counterclockwise swinging of member 35 and the jumping of the connector roller 39 from the ineffective notch 36 to the effective feed notch 37.

The connector 40 is pivoted on a stud 41 which is also the fulcrum of the feed pawl 31 and both are pivoted on the feed operating lever 46 which is in turn loosely pivoted on the main stud 10. Lever 46 is connected by link 45 to a similar lever for the left unit which is made automatically ineffective by any shift which makes the right unit effective. A large spring 43 tends to hold

the connector 40 with the roller 39 on the free end, in one or the other of the notches 36 or 37 and held there flexibly as a connection between the driver 35 and the driven lever 46. Another spring 44 on feed pawl 31 tends to pull it into action whenever it passes to the right of the camming action of stud 33.

When the ribbon R is near exhaustion on the right spool 11, a button 57 thereon is drawn between the guide roller 15 and an extending tab 50 on a reverse lever 49 which is loosely pivoted on the roller stud 18. The button 57 then hits the tab 50 on the right and causes the lever 49 to rock in a counterclockwise direction and in so doing it lifts an abutment pawl 52 into the path of stud 41. The abutment pawl 52 is pivoted at 54 on the reverse lever 49 and is held against it by a spring 51 which tends to restore both the pawl and the lever. Normally the abutment pawl end 53 is lowered so that stud 41 can swing over it and thus continue to leave the connector 40 with the roller 39 in the ineffective notch 36, but when a reversal is in order as shown, then the abutment is raised and prevents the stud 41 and the attached connector and pawl from moving to the left with the notched member 35. The result is that the connector 40 is lifted and the roll thereon is jumped into the effective feed notch 37 so that on the subsequent clockwise swing of the drive member 35, the feed pawl 31 is swept away from the depressing action of stud 33 and allowed to engage a tooth of ratchet 30 to drive it in a clockwise direction. In alternation with printing and in concert with paper feeding, the feed pawl continues to operate the ratchet in winding the inking ribbon on the right-hand spool 11 until the supply of ribbon on the left spool is exhausted to the point where a button at that end is brought into play similarly on the reversing mechanism of the lefthand unit as already explained with reference to the righthand unit.

Referring back to Fig. 1, it is noted that the frame 60 carries pairs of spring clips 61 and 62 on opposite sides of the ribbon mechanism and into these clips is adjustably held cylindrical plastic ink holders, capsules or reservoirs 63 and 64. These ink holders are of a disposable nature and provide ink for a substantial period of time after which they are readily replaced by a unit with a fresh supply of ink. Extending near the top of each ink holder 63 or 64 is a projecting cylinder 65 containing the upper part of a wick 66 which extends down into the main well of the holder and projects beyond the cylinder 65 and into contact with the inking guide rollers with which the ribbon R is in driving contact. As shown in Fig. 3 it is apparent that the end of the inking wick 66 is pressed against the free part of the periphery of guide roller 20 so that as the roller is rotated in a clockwise direction the ink is spread by the wick on the roller as it rotates under it. The ink is drawn up through the holder and tube by capillary action and as long as the guide roller is rotated the ink is deposited thereon and the wick sets up a demand which is continuously supplied from the reservoir. There is a similar form of cooperation between the inking holder 63 and guide roller 13 as there is between the ink holder 64 and the guide roller 20. It is noted in Fig. 1 that both of these guide rollers 13 and 20 are formed with attached ratchet formations 26 and 27 which are made integral with the bottom of the guide roller as shown in Fig. 3. Cooperating with each ratchet is a spring finger or detent 70 which is riveted to the fixed frame member 60 and formed with a flexible extension which abuts against the ratchet teeth of the formations on the lower parts of the guide rollers 13 and 20. With reference to the inking arrangement at the left in Fig. 1, it is apparent from the shape of the ratchet teeth on formation 27 that as long as the inking ribbon R is moving in a direction towards the printer; i. e., tending to turn roller 13 in a clockwise direction, the roller is stopped from movement because the spring finger 70 abuts against the stopping side of the ratchet teeth 27. Therefore, when the inking rib-

bon R moves toward the printer, the guide roller 13 is prevented from moving and therefore the wick resting thereon has no demand for replacement of ink and there is no ink supply at that point at that time. However, while the ribbon is so moving it is being rewound at the right side in Fig. 1 and the guide roller 20 is being rotated in a clockwise direction by frictional contact with the ribbon R and roller 20 is allowed to so move because the ratchet teeth 26 thereon are moving away from the abutting end of the spring finger 70. Therefore, at this point where the ribbon is about to be rewound, the guide roller 20 is permitted to rotate and the inking wick cooperating therewith has a continuous demand for ink caused by the rotation thereunder of the guide roller 20 intermittently as it deposits ink on the ribbon and returns under the wick with a clean surface setting up a capillary demand which is supplied through the wick. It will be realized that movement in the opposite direction causes the reversal of the action, with guide roller 20 then being stopped in an effort to turn in a counterclockwise direction and prevented from doing so by the cooperating spring finger 70, while rotation of guide roller 13 in a counterclockwise direction is permitted and ink is supplied from the holder 63 at the left and deposited on the ribbon R just before it is rewound on the spool 11.

While there have been shown and described and pointed out the fundamental novel features of the invention, as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a ribbon reinking device, a pair of guide rollers, a pair of winding spools, a ribbon extended between said guide rollers with its ends wrapped around said spools, said ribbon being drawn past said guide rollers and tending to move them in both directions, means for feeding and reversing the motion of said ribbon, a frame, a pair of spring clips mounted on said frame, a pair of ink reservoirs adjustably held in said spring clips, each of said reservoirs being provided with an extending cylindrical tube through which is projected a wick for carrying ink upward out of the holder and against a related guide roller against which it is pressed, a ratchet formation on each guide roller, and a spring finger detent cooperating with said ratchet formation to prevent movement of the roller when the ribbon contacting therewith is moved away from the adjacent spool, said ratchet formation and detent permitting movement of the roller and transferral of ink to the ribbon when it is moved in the direction towards the adjacent spool for rewinding.

2. A ribbon reinking device having, in combination, two spools between which said ribbon is extended, ribbon feeding and reversing mechanism cooperating with said spools, a pair of guide rollers, one of which is adjacent each spool and about which said ribbon is guided, a pair of removable ink capsules with inking wicks extending therefrom and into contact with said rollers, a ratchet wheel on each roller, and a flexible flat spring detent for stopping said ratchet wheel and roller from being rotated by the ribbon except when it is passing from the roller towards the adjacent spool to be rewound, whereby reinking is done on a part of the ribbon about to be rewound, to allow time for the ink to spread evenly.

References Cited in the file of this patent

UNITED STATES PATENTS

1,298,045	Huddleston	Mar. 25, 1919
1,841,139	Muller	Jan. 12, 1932
2,104,396	Hoppenstand	Jan. 4, 1938
2,588,548	Markes	Mar. 11, 1952