July 27, 1965 E. KUHNLE ETAL 3,196,781

TRAVELLING ROLLER AND CUTTING MEANS IN LABEL-MAKING APPARATUS

Filed March 5, 1962 2 Sheets-Sheet 1

FIG. 1

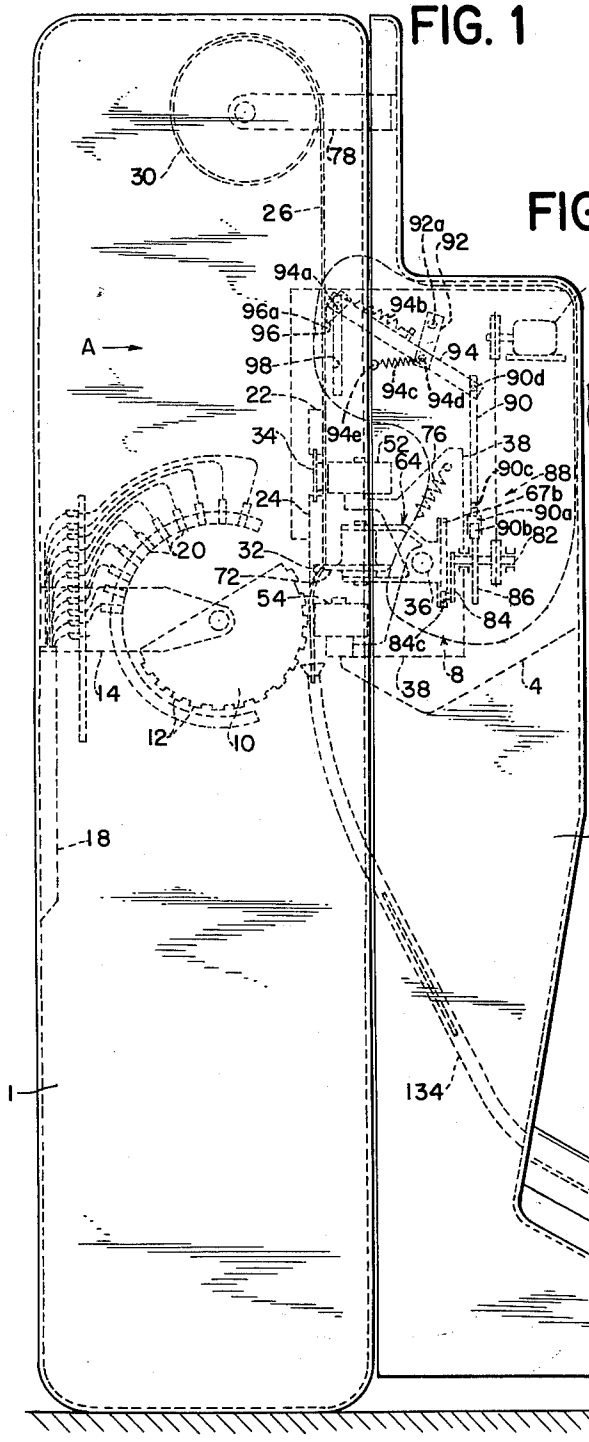


FIG. 3a

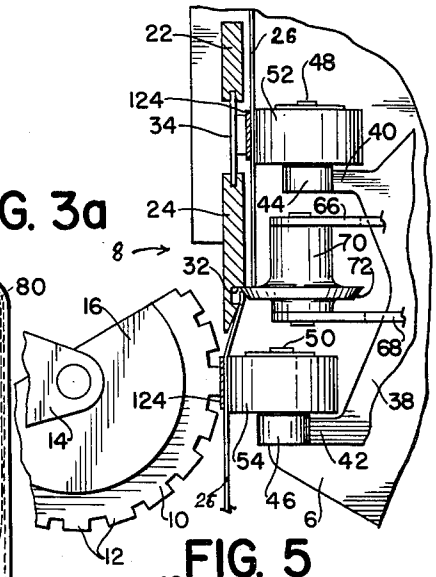


FIG. 5

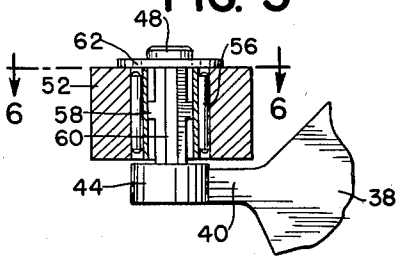
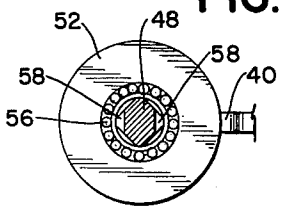


FIG. 6



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TRAVELLING ROLLER AND CUTTING MEANS IN LABEL-MAKING APPARATUS

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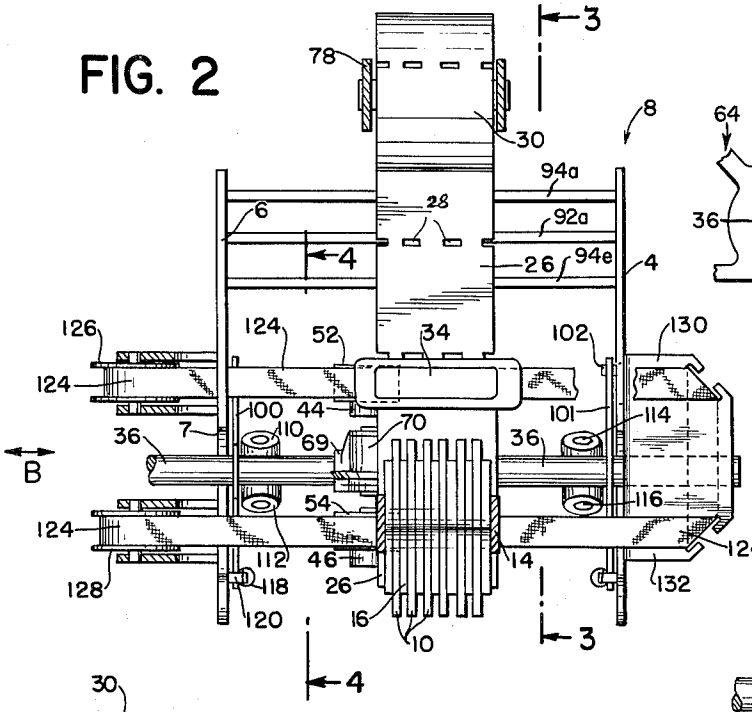
FIG. 2



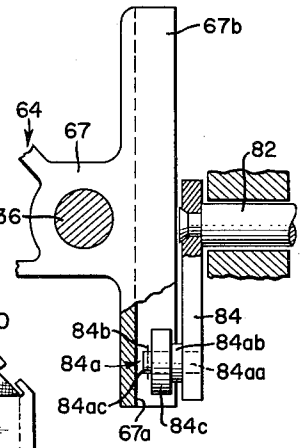


FIG. 8

FIG. 7

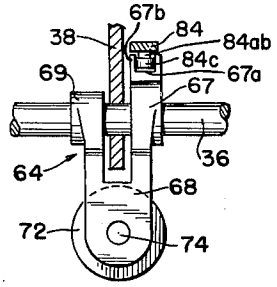


FIG. 3

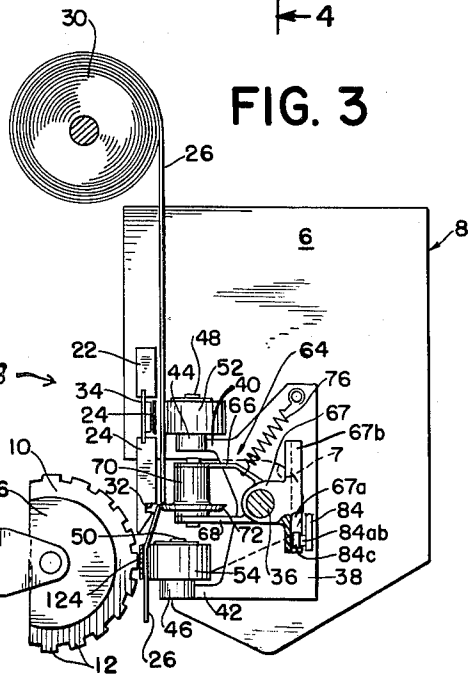
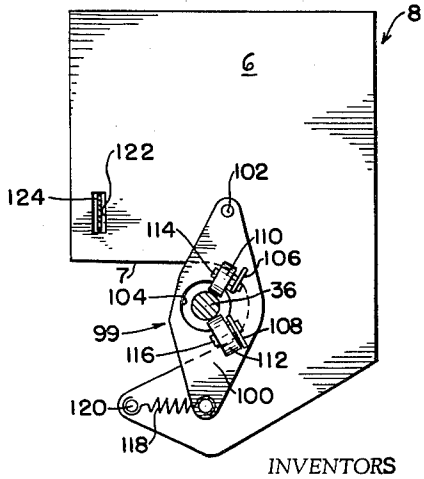


FIG. 4



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TRAVELLING ROLLER AND CUTTING MEANS IN LABEL-MAKING APPARATUS

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Claims priority, application Germany, Mar. 7, 1961, B 61,554
4 Claims. (Cl. 101—66)

This invention relates to an apparatus for the production of printed labels, more particularly an apparatus of a nature described above, adapted to apply printing to a continuous paper tape and to cut same into labels.

In known devices of this type, the printing onto the label is accomplished by means of pressure or impact printing, by utilizing inked ribbons, pre-inking of the type set, or inked printing blocks. Such machines have a disadvantage in that, in order to withstand the forces arising due to the printing pressure or impact, the construction of the apparatus has to be rigid and sturdy. The label cutting operation in such machines is accomplished separately of the printing process.

It is an object of the present invention to provide a novel apparatus and method for the preparation of printed labels and cutting same in a single step.

It is another object of the invention to provide a label printing and cutting apparatus of light weight and simple construction.

Accordingly, the apparatus of the present invention provides a label printing apparatus adapted to operate on a continuous roll of material, most frequently paper, applying the indicia by means of at least one specially mounted roller, which is adapted to roll past the printing indicia-bearing element of the machine having the paper strip to be printed therebetween. The linear printing pressure thus applied is advantageous, since a high specific linear pressure can be applied while the total applied pressure is still advantageously low, consequently an intensive imprint can be obtained on the label. As a result, the entire apparatus can be of a considerably less bulky structure and the requirement for the driving elements is also correspondingly lower, resulting in reduced wear and other attendant economic advantages.

Another advantage of the present construction is that a label separating cutting device can be advantageously coupled with the pressure roller support which reciprocates transversely to the continuous paper tape.

The invention includes a support shaft adapted to transversely reciprocate between two mounting plates, the supporting shaft being loosely mounted between said plates. Mounted on the support shaft are at least one specially mounted printing-pressure roller, and a cutoff mechanism, as the support shaft is reciprocated substantially synchronized with the intermittent paper-tape indexing transport mechanism, the printing pressure roller rolls past the indicia to be printed, pressing the paper strip to be printed at a relatively large specific linear pressure against the indicia to be applied, and simultaneously the cutting mechanism severs a printed label from the tape. In the preferred embodiment, an inked ribbon is used for the application of the indicia, the ribbon being led past the printing block in a manner similar to the transfer means of typewriter ribbons.

Further objects and advantages of the invention will become apparent from the following detailed description, and drawings wherein:

FIG. 1 is a side view of the entire apparatus;

FIG. 2 is a rear elevational view of the printing and cutting apparatus in the direction of the arrow A in FIG. 1;

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FIG. 3 is a side view of the printing and cutting apparatus, along the line 3—3 in FIG. 2;

FIG. 3*a* shows the printing and cutting portion of FIG. 3 with some portions thereof omitted;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 2;

FIG. 5 is a transverse sectional view across one of the pressure rollers of the printing and cutting apparatus;

FIG. 6 is a section taken along line 6—6 of FIG. 5;

FIG. 7 is a somewhat enlarged plan view of the cutting member and its support; and

FIG. 8 is a partial side view of the printing and cutting apparatus, representing a portion of FIG. 3 on a somewhat enlarged scale.

The apparatus of the invention may print fixed and variable indicia onto the labels. It can print only fixed, or only variable, or simultaneously both types of indicia. The embodiment described, contains provisions for simultaneously printing both types.

In FIG. 1, the preferred embodiment of the device of the present invention is shown located in a housing 1, the housing having a removable cover portion 2 hingeably attached thereto. As also shown in FIG. 2, mounting plates 4 and 6 are provided for the printing and cutting apparatus, generally designated as 8, the mounting plates 4 and 6 being attached to the cover portion 2.

A set of discs, constituting a typeset 10, the discs bearing indicia 12 thereon, is mounted within the housing 1 by a bracket 14. Spacers 16 (FIG. 2) are separating the discs within the typeset 10. The discs constituting the typeset 10 are selectively rotatable and in the preferred embodiment can be remotely adjusted, as, e.g., controlled by the detector of an automatic weighing scale (not shown) in case the information to be indicated by the variable indicia to be printed onto the label are in connection with the weight of the weighed item. The remote control may be accomplished by e.g., electromagnetic control means 20 for the variable printing discs 10, the control means being connected to the scale by conductors 18. The preferred embodiment, as to be described further, is adapted to apply a fixed and a variable imprint to the label, whereby the variable imprint is printed by the typeset 10 and its indicia 12.

As shown in FIGS. 3 and 3*a* guidepieces 22 and 24 are attached to the mounting plate 4 for guiding a paper strip 26 provided with perforations 28. The paper strip 26 is drawn from a supply roll 30. A cutting counter-edge 32 is provided integral with the guidepiece 24.

A printing block 34, having indicia thereon can be interchangeably located and held fast between the mounting plates 4 and 6 in grooves (not shown) provided in the guidepieces 22 and 24. The exchangeable printing block is used to apply the fixed set of indicia to the label.

A support shaft 36 is mounted, by means to be further detailed, on the side of the paper strip 26 opposite the guidepieces 22, 24 and the printing block 34. The support shaft 36 is adapted to reciprocate in the directions indicated by the double-headed arrow B in FIG. 2. The mechanism performing the reciprocation will be described in detail with reference to FIG. 8. A carrying plate 38 is firmly attached to the support shaft 36. The side of the carrying plate 38 facing the printing block 34 is provided with two protruding support-arm formations 40 and 42 having at their free ends integral therewith shaft mounts 44 and 46. Shafts 48 and 50 are mounted within the shaft mounts 44 and 46, and pressure rollers 52 and 54 are mounted, in a manner to be described below, onto the shafts 48 and 50.

The rollers 52 and 54 are mounted on their respective shafts 48 and 50 in an identical manner, therefore in FIGS. 5 and 6 the manner of mounting of roller 52 is illustrated only. The roller 52 is formed as the outer

ring of a needle-bearing having needles 56 disposed parallel with the shaft 48. The needles 56 are adapted to roll on the inner surface of the roller 52. The journal shaft 48 is formed with protruding centerpieces 58, the shaft having an almost square cross section in a manner so that its one diagonal is aligned with a vertical centerplane of the journal shaft 48. The edges of the protruding centerpieces 58 which are disposed along the diagonal, are machined off in such a manner that the center of each edge of the protruding centerpieces serves also as a pivoting point for the inner bearing surface of roller 52.

The edges 60 of the journal shaft 48, which are disposed along the other diagonal, are machined flat and provide throughout the length of the shaft 43 narrow mounting surfaces, firmly supporting the inside bearing surface. The roller 52 is secured onto the shaft 48 by means of a securing plate 62. With the aid of the above-described special mounting of the roller 52, it is free to describe a special unidirectional tumbling motion in the plane of the drawing about the protruding centerpieces 58. On the other hand, the tumbling of the roller is prevented and the roller is journaled without backlash in a plane perpendicular to the drawing.

A journal housing 64 is rotatably attached between the rollers 52 and 54 on both sides of the carrying plate 38 (see also FIG. 7). The journal housing 64 is formed with fork-like protruding arms 66 and 68. The arms are interconnected by bearing members 67 and 69 (FIGS. 2, 3 and 7) rigid with shaft 36. A cylindrical hub 70 having a circular protruding cutting edge 72 thereon is rotatably mounted on a shaft 74 carried by the fork-like protruding arms 66 and 68. One end of a tensioning spring 76 is attached to the journal housing 64 and at its other end to the carrying plate 38.

The supply roll 30 is rotatably mounted within a mounting 78 (FIG. 1). The mounting 78 is firmly attached to the cover portion 2. The paper strip 26 is drawn intermittently from the supply roll 30 by a drive mechanism, driven by a motor 80, and to be described hereunder. The support shaft 36 is connected to a drive shaft 82 by means of an eccentric coupling 84. A cam 86 is firmly attached to the drive shaft 82 for rotation therewith. The drive shaft 82 is connected to the motor 80 in driving engagement by a belt-pulley system 88.

Details of the reciprocating drive, termed eccentric coupling and identified by numeral 84, are the following: Member 84 is rigid at its upper end, as viewed in FIGS. 1 and 8, with drive shaft 82; its free end carries a plug 84*a*. The latter has an end 84*aa* of reduced thickness, inserted into the coupling member 84, followed by an enlarged neck portion 84*ab*, and a protruding portion 84*ac* on which is rotatably journaled a roller 84*c*. A cotter pin 84*b* or like member passes through the outer end of plug portion 84*ac* so as to secure roller 84*c*.

Bearing member 67 has a longitudinal portion 67*b* lodging a recess 67*a* slightly wider than the width of roller 84*c*. Now when member 84 rotates, upon the motor 80 driving shaft 82 through the intermediary of pulley 88, the circular path described by roller 84*c* will result in a vertical reciprocation thereof within recess 67*a*, and a rocking action or horizontal reciprocation of bearing members 67, 69 together with support shaft 36.

A link 90, having a cam follower or roller 90*b* at its lower end, is in constant engagement with cam 86. As shown in FIG. 1, roller 90*b* is attached to a short link 90*a* which is connected to link 90 by way of a pivot 90*c*. The upper end of link 90 is pivotally connected at 90*d* to an arm 94 which is pivoted at 94*d* from one end of a member 92. The other end of member 92 is connected to a bar 92*a* (shown in FIG. 2), the latter being arranged between the mounting plates 4, 6. The remote end of arm 94 is connected to a similar bar 94*a* (also shown in FIG. 2) slidable in slits 98 of the plates 4, 6.

The arm 94 has a drawing finger 96 pivoted at the same end, with a projection 96*a* attached thereto which

is adapted to engage one of the perforations 28 of the strip 26. The projection 96*a* is urged toward the strip by means of a spring 94*b* so that it will index a length of strip 26 downward, for subsequent printing and cutting operations. Another spring 94*c*, attached between pivot point 94*d* and a further bar 94*e* between plates 4, 6, is adapted to urge bar 94*a* against one of the sides of the slits 98.

As best shown in FIG. 4, a loosely mounted bearing 99 is provided for the support shaft 36 within the mounting plate 6. The bearing 99 includes a substantially rhomboidal bearing plate 100, disposed parallel to the mounting plate 6, and attached thereto at the top of the plate 100 by means of a pin 102. A bore 104 is provided approximately in the center of the bearing plate 100, the diameter of the bore being considerably larger than the diameter of the support shaft 36 protruding therethrough.

Bearing supports 106 and 108 are integral with and protruding from the bearing plate 100 on its side opposite the mounting plate 6. Shaft support rollers 110 and 112 are rotatably mounted onto axles 114 and 116, the ends of the axles 114 and 116 being attached to the bearing supports 106 and 108. The direction of the axles 114 and 116 is such that the rollers 110 and 112 are facing radially toward the bore 104 and the rolling surfaces of the rollers 110 and 112 are adapted to engage the reciprocating support shaft 36. A spring 118 is attached at its one end to the lower end of the bearing plate 100, and the other end of the spring is attached to a pin 120 firmly attached to the mounting plate 6.

A recess 7 is provided in the mounting plate 6, as shown in FIGS. 2 and 4, in order to provide for the radial movement of the support shaft 36. A bearing support structure similar to the one shown in FIG. 4 is also provided on the mounting plate 4 for the support shaft 36. This structure includes a bearing plate 101 similar to plate 100 described hereinabove. A slot 122 is cut in the mounting plate 6 for a ribbon 124, for reasons to be explained in the following.

As also shown in FIG. 2, the inked ribbon 124 proceeds from a spool 126 mounted on the mounting plate 6 to a spool 128, along a path between the roller 52 and the printing block 34 to a direction-altering hook 130, then to another direction-altering hook 132, and subsequently between roller 54 and the typeset 10 to the roller 128. As soon as the ribbon 124 is depleted from either one of the spools 126 or 128, the direction of movement of the ribbon can be reversed, e.g., by means known in typewriters.

As shown in FIG. 1, a gathering chute 134 is provided for the labels printed and cut off the continuous paper strip 26. The mechanism associated with the gathering chute 134 and the label pick-up for collecting position 136, is described in our co-pending application for U.S. Letters Patent Serial No. 176,686, filed on April 1, 1962, and assigned to the same assignee.

In operation, the support shaft 36 is moved to one of its end positions in the direction indicated by the arrow B, assuming that this end position is the one shown in FIG. 2, and one of the perforations 28 is in alignment with the cutting edge 72. The rotation of the drive shaft 82 causes the supporting shaft with its associated components to move in the right-hand direction whereby the supporting pressure rollers 52 and 54 press the label against the typeset 10 and the printing block 34, and the inked ribbon 124 therebetween.

Upon continuous movement, the rollers 52 and 54 travel the width of the paper strip 26 and uniformly apply pressure to the printing surfaces causing a transfer of the required indicia upon the paper strip. Due to the special journaling of the rollers 52 and 54, a limited adaptability is provided for the rollers and therefore the imprint will be sharp and uniform. Simultaneously with the lateral motion of the rollers 52 and 54, the hub 70

with its rolling cutting edge 72 cuts through the connecting portions of the perforations 28, the cutting edge at 72 cooperating with the cutting counter-edge 32 for the cutting operation. The tensioning spring 76 constantly maintains the cutting edge 72 in cutting cooperation with the cutting counter-edge 32.

As soon as the components associated with the supporting shaft 36 have severed the width of the paper strip 26, the severed and double-printed label drops into the collecting chute 134 and is carried thereby into its associated collecting position 136.

After each combined printing and severing move indexing feed of the paper strip 26 occurs, the length of the feed corresponding to the distance between adjacent perforations 28. The inked ribbon 124 can be coupled to the drive mechanism to cause simultaneous advancing thereof. Subsequently, the direction of motion of the supporting rod 36 and its associated components is reversed by the drive shaft 82 and the eccentric coupling 84 and upon the return motion in the leftward direction of the supporting shaft 36 and its associated components, a subsequent printing and severing of a subsequent label takes place.

It is to be understood that the invention is illustrated by means of a preferred embodiment only, and the true scope of the invention is to be interpreted from the appended claims.

What is claimed is:

1. A label printing and cutting machine, comprising a supply roll having a strip wound thereon of a material from which the labels are to be made, driving means for indexingly drawing said strip off said supply roll, a support shaft reciprocable by said driving means transversely across said strip, first and second printing pressure rollers mounting for reciprocation from said shaft, a cutting roller mounted for reciprocation from said shaft, stationary cutting counter edge means mounted on the side of said strip substantially opposite said cutting roller, fixed printing means mounted on the side of said strip opposite said first printing roller, variable printing means mounted on the side of said strip opposite said second printing roller, and an inked ribbon disposed between said strip and said fixed and said variable printing means and operatively connected to said driving means for indexing movement past said fixed and said variable printing means.

2. A label printing and cutting machine comprising a supply roll having a strip wound thereon of a material from which the labels are to be made, a reciprocable support shaft, means for reciprocating said support shaft transversely across said strip, at least one printing pressure roller mounted for reciprocation from said shaft, a cutting roller mounted for reciprocation from said shaft, at least one printing means mounted on the side of said strip substantially opposite said printing roller, means for cyclically feeding said strip from said supply roll to said printing means, intermittently with the operation of said reciprocating means, and stationary cutting counter edge means mounted on the side of said strip substantially opposite said cutting roller.

3. A machine according to claim 2, further comprising means for coupling said cutting roller to said printing roller for the application of indicia onto said strip, simultaneously with the cutting of said labels from said strip as a result of the operation of said reciprocating means.

4. A machine according to claim 2, further comprising inked ribbon means between said strip and said printing means and operatively connected to said feeding means for cyclical movement past said printing means.

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