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Printing device

The present invention relates to a tag printing device, particularly a tag printing device that can
5 classify a plurality of tags relating to different types of product item when the plurality of tags relating to the different types of product item are produced from a continuous paper roll feeding from a feeding reel.

It is known to attach to clothing and the like tags
10 displaying the brand name and an article number, the size, the selling price relevant to the clothes.

One type of tag printing device for producing a plurality of tags, from a continuous paper in the form of a roll delivered from a feeding reel member, is arranged
15 to print predetermined formats onto every tag, and the printed continuous paper having predetermined lengths is cut into tags of proper lengths by cutting means.

When the cutting operation is completed, the cut tags are usually stacked into predetermined numbers of
20 sheets by a stacking device called a "stacker" and then are sorted and are used manually.

In a printing operation, it is not always required to print the same formats on all of the plurality of tags produced from a single roll of continuous paper. As
25 there are differences in colour and size of the same clothes, the printed format may be desired to be changed in the middle of the continuous paper.

It would therefore be convenient for the sorting of a plurality of tags to find the place where the printed
30 formats are changed in a pile of tags on a stacker.

In this manner, a conventional arrangement provides that when printing formats are changed, the tag is cut off at a position which is displaced from a regular



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cutting position in order to make a short tag and a long tag. The long tag projects from the piled tags (the upper stream surface in the feeding direction of the piled tags) when the tag is piled on the stacker, and
5 thereby enables the position to be distinguished.

However, a problem with that operation is that two pieces of tag corresponding to the long and short tags are wasted, and furthermore problems may occur when the tags are piled on the stacker.

10 For overcoming this problem, there is, as set out for example in Japanese Patent Publication Laid open No Showa 59(1984)-1288, a tag printing device comprising a mark applying member and a data inputting circuit provided with a control member for controlling the tag
15 printer. When the format for printing on the continuous paper is changed, the printing device is supplied with a control input to apply paint to the end surface of the continuous paper by controlling of the driving operation of the mark applying member.

20 A tag printing device requires a means for controlling accurately the timing of the start of printing and of cutting of the continuous paper, and it is, conventionally, arranged that recess portions spaced at the interval of tag widths are provided on both sides
25 of the width of the continuous paper, allowing the timing of the start of printing and of cutting to be controlled by means of detecting the recess portion thereof.

An arrangement to sort a plurality of tags piled up on a stacker is provided. However, it is sometimes
30 necessary to classify the plurality of tags not only when the printing formats are changed, but also when the user is different (clothes, store etc) or the number of tags in accordance with every delivery to a user are made,

even if the printing formats of the plurality of tags are the same, in which case a marking is also required.

In the cases where conventional tag printing devices or the like are operated, a mark is applied on the end
5 surface of the continuous paper only when the printing formats are changed. It is inconvenient not to be able to optionally apply the mark thereon in accordance with every various aspect of classification.

As for this case, in a conventional tag printing
10 device the requirement to input the state to be arranged for classification into the entry circuit in the control member provided on the tag printing device, makes the system complicated.

Moreover, when the number of applied markings is
15 increased in accordance with every various aspect of classification, it enables recognition of the position of the applied markings, but it causes inconvenience not to provide the reason for the classification of the position.

20 However, since in a conventional method for controlling the timing of the start of the printing and of cutting by detecting recess portions that are provided on both sides of the width of the continuous paper, the recess portion is disturbed on applying the marking to
25 the continuous paper, it gives rise to the problem that it is hard to correctly apply the mark.

The present invention was accomplished in the light of the foregoing problems and the objective is to provide a tag printing device having the capability not only to
30 enable the position to be classified to be recognised but also to recognise a classification according to various predetermined settings relating to the use of the tags when the plurality of tags are piled on the stacker, and

also having the capability to apply the mark on the end surface of the continuous paper.

In a first aspect the present invention provides a tag printing device for producing a plurality of tags
5 having continuous paper in the form of a roll delivered from the feeding reel member, being arranged to print predetermined formats onto every tag formed thereon by printing means, and in which the printed continuous paper having predetermined lengths is cut into suitable lengths
10 for the tags (being the distance between the detected hole perforations thereon) by cutting means,

the tag printing device being characterised in comprising:

a mark applying means for applying a mark on the end
15 surface of the continuous paper and for enabling the application of a mark with a plurality of colours located between the printing means and the cutting means;

a detecting sensor for detecting a tag hole formed on the tags for passing a string through each tag thereon
20 provided on the continuous paper;

printing means for printing the predetermined formats onto every tag provided on the continuous paper in accordance with the result detected by the detecting means;

25 cutting means for cutting the printed continuous paper having predetermined lengths into suitable lengths for the tags being the distance between the detected hole perforations thereon in accordance with the result detected by the detecting means;

30 controlling means for controlling the timing of the drive of the mark applying means in accordance with the result detected by the detecting means for detecting the tag hole.

In the second aspect of the present invention, the tag printing device is provided with a marking applying means for application of the mark on the end surface of the continuous paper and, when the plurality of tags are
5 piled on the stacker, allowing not only the position to be classified to be recognised but also classification according to various predetermined settings.

In other words, a tag printing device that, in the process of producing the plurality of tags from the
10 continuous paper, for example, enables application of a red colour marking on a plurality of tags in the case where the end user is changed and application of a black colour marking thereon in cases where printing formats are changed from one to another. In this manner it is
15 made possible not only for the position to be classified to be recognised but also to classify according to various predetermined purposes. The marks not only identify the position in the stack of tags where a change in a quality such as print format or destination occurs,
20 but they also convey information relating to the nature of that change.

In the third aspect of the present invention, a tag printing device having a sensor for detecting the tag hole position thereby utilising the position of the tag
25 hole on the tags (which is so formed that the string can be passed through each hole thereon) to enable a control means to control the timing of the drive for performing operation of the printing means and the cutting means and the mark applying means.

30 In this manner it is provided that, since it is not necessary to make a recess portion on the end surface of continuous paper as has been conventional, the marking applying means, therefore, is able to apply the marking

in an accurate position on the continuous paper when the marking is applied on the end surface of the continuous paper by the marking applying means.

Preferably, the printing device has a mark applying
5 means, which comprises a number of inking devices that have a plurality of ink colours and which are arranged to apply the markings in a plurality of colours.

Preferably, a sensor is provided upstream of the printing means and a sensor is provided upstream of the
10 cutting means. In this manner an increase in the accuracy in timing the operation of the drive of the printing means, cutting means and mark applying means may be achieved. In the case where a sole detecting sensor is provided, the ability to accurately time the operation
15 of the drive of the cutting means thereof decreases as the distance from the position of the sensor to the position of the cutting means is increased.

Preferably, the tag printing device comprises a computer wherein the information relevant to the tags to
20 be produced is managed, and the printing device is characterised in that the mark applying means is controlled in accordance with instructions for applying the mark from the computer.

The information relevant to the tags to be produced
25 including the variety of information required for every product item may be obtainable from the computer which manages the manufacture and shipment of the products to be labelled with the tags.

Preferably, the printing device comprises a sensor
30 for detecting a punched hole rather than a tag hole formed on the tags on the upstream side of the printing means, such that when the punched hole is detected by that punched hole sensor, the mark applying means may be

controlled to apply the mark on the tag formed with punched hole.

The punched hole which is, in this manner, formed for reasons other than for threading the string into the tag hole, is detected by a detecting means for detecting the punched hole, allowing the operation of mark applying means to apply the mark on the side (in the width direction) of the tags provided with the punched hole. In this case the relevant information used to mark the tags is not present on the control member of the printing device or on the computer and the operation to apply the mark can be performed only when the punched hole is formed.

A more complete understanding of these and other features and advantages of the present invention will become apparent from careful consideration of the following detailed description of certain embodiments illustrated in the accompanying drawings.

Figure 1 is a schematic side view of a tag printing device connected to a stacker according to an embodiment of the present invention;

Figure 2 is a perspective view illustrating the structure of a stacker;

Figure 3 is a schematic side view illustrating the configuration of an ink roller device;

Figure 4 is a plan view illustrating a connecting portion on a continuous paper;

Figure 5 is a block diagram illustrating a structure of a control means of a tag printing device;

Figure 6 is a view illustrating printing control and operation of control member with respect to control of the operation in the case where printing formats were

changed.

The reference numerals denote the following:

- | | |
|-------|------------------------------|
| 10 | Tag printing device |
| 11 | Tags |
| 5 12 | Stacker |
| 14 | Continuous paper |
| 14A | End side of continuous paper |
| 16 | Feeding reel |
| 18 | Printing means |
| 10 20 | Cutting means |
| 22 | Mark applying means |
| 24 | Control means |
| 26 | Computer |
| 30 | Guide roller |
| 15 34 | Guide plate |
| 38 | Thermal print head |
| 40 | Platen roller |
| 42 | Ink ribbon |
| 44 | Ribbon supplying reel |
| 20 46 | Ribbon rewinding reel |
| 48 | Tag hole |
| 50 | First sensor |
| 52 | Pulse motor |
| 54 | Movable upper blade |
| 25 56 | Fixed lower blade |
| 58 | Second sensor |
| 60 | Stacker housing |
| 62 | Bottom plate |
| 64 | Stopper plate |
| 30 66 | Holding member |
| 68 | Pulling roller |
| 72 | Endless conveyer belt |
| 74 | Exit chute |

	76	Slide slot
	78	Engage slot
	79	Serrated stopper member
	80	Slot
5	82	Pin
	84	Lengthwise extending slot
	86	Ink roller device
	87	Ink roller device
	88	Solenoid
10	88A	Plunger
	90	Lever member
	90A	Horizontal section
	90B	Lower side of pivoting lever
	92	Ink roller
15	94	L shape fixed plate
	94A	Horizontal section
	94B	Vertical section
	96	Pin (Figure 3)
	97	Supplemental frame
20	98	Notch portion
	100	Spring
	102	Punched hole detecting sensor
	104	Punched hole
	106	Tape
25	108	CPU (Central Processing Unit)
	110	Common bus
	112	ROM (Read-Only Memory)
	114	RAM (Random Access Memory)
	116	Program memory area
30	118, 120	Permanent memory area
	122	Printing data memory area
	124	Numbering counter
	126	Step counter

- 128 Printing control circuit
- 130 Motor driving circuit
- 132 Flip-flop circuit
- 133 Solenoid driving circuit
- 134 Data Input circuit
- 135 Printing data
- 136 Mark applying data
- 137 Numbering data

Figure 1 is a schematic side view of a tag printing device equipped with a stacker 12 according to an embodiment of the present invention.

Referring to Figure 1, a tag printing device 10 according to an embodiment of the present invention comprises a feeding reel 16 for feeding continuous paper in the form of a roll which is loaded therein, printing means 18, cutting means 20, mark applying means 22 and controlling means 24 for controlling the tag printing device 10. The printing device 10 is connected to a computer 26 which manages the information relevant to the tags to be produced.

The continuous paper 14 capable of being cut into pieces thereby producing a plurality of tags 11 (referring to Figure 4) is delivered from the feeding reel 16 to the feeding thereof and is guided by both the upper guide 32 comprising a plurality of guide rollers 30 and the lower guide 36 formed with a guide plate 34 to the printing means 18.

The upper guide 32 is moveable to be displaced upward when the continuous paper 14 is put through the feeding passage.

The printing means 18 has at least one thermal printing head 28 and a platen roller member 40, and therebetween is pressed the continuous paper 14. An ink ribbon 42 is located between the thermal printing head

(or heads) 38 and the continuous paper 14. The ribbon 42 is delivered from a ribbon supplying member 44, passes through the printing means 18 and is then wound up by a ribbon take-up reel 46.

5 The ink ribbon 42 is able to move with the feeding movement of the continuous paper 14 and the rotation of the platen roller 40, so is capable of applying consecutive printing on the continuous paper 14 as it is fed through the device.

10 As for the printing method, various printing methods, such as a thermal heating method, static electric method, ink jet method and drum impact method and so on, are applicable to the present invention. This detailed description of the preferred embodiment is
15 described with reference to a thermal heating method.

 The control means 24 that is provided on the tag printing device 10 begins, when any one of the tag holes 48 is sensed by the first detecting sensor 50, to count the number of pulses to be supplied to a pulse motor 52.
20 When the count of the predetermined number of pulses reaches the fixed value corresponding to the distance between printing start position and the position of the first detecting sensor 50, the printing means 18 is driven. In this manner, the drive timing of printing
25 means 18 is controlled.

 After the desired printing formats have been printed by the printing means 18 on the continuous paper 14, it is passed through the mark applying means 22 and then is delivered to the cutting means 20, to be cut into a tag
30 of proper length.

 The cutting means 20 is provided with a rotatable upper blade 54 and with a fixed lower blade 56. A second detecting sensor 58 capable of detecting the tag hole 48

on the continuous paper 14 is provided in an upstream position neighbouring the cutting means 20.

Control means 24 is, when the located tag hole 48 on each of the tags is sensed by the second detecting sensor 58, able to count a predetermined number of pulses (steps) to be supplied to a pulse motor 52 which in turn permits, when the count of the predetermined number of pulses (steps) reaches the fixed value corresponding to the distance between the printing start position and the position of the second detecting sensor 58, the control of the drive of the cutting means 20. In this manner, the drive timing of the cutting means is controlled.

A plurality of the tags 11 cut by the cutting means 22 is expelled by an exit chute roller 75 which outputs the plurality of the tags 11 through an exit chute 74. The tags then enter into a stacker 12 and are stacked in a pile.

As shown in Figure 2, a stacker 12 is provided with a stacker housing 60, a bottom plate 62 for loading the tags 11 thereon, a stopper plate 64 (shown in Figure 1) which is able to slide freely on the bottom plate 62 and which contacts the extreme end in the feeding direction of the tags 11, and a holding member 66 for holding the tags 11 down to the bottom plate 62 from above.

At a predetermined distance from the upper surface of the bottom plate 62 within the stacker 12, neighbouring the tag printing device 10, there is a pulling roller 68 and an endless conveyor belt 72, driven by a motor (not shown) to rotate in the direction indicated by the arrow 70. The tags 11 are outputted in sequence from the exit chute 74 of the tag printing device 10, and squeezed between the pulling roller 68 and the endless conveyor belt 72, and thereby the tags 11 are

drawn into the tag stacking position 62A. The
illustrated tag 11 is inserted into a gap between the
bottom plate 62 and the lowest of the piled tags already
located on the bottom plate 62, and thus the end edge in
5 the feed direction of the tags come into contact with the
stopper plate 64 that extends vertically upward from the
bottom plate 62. Thus as the printed tags 11 are
delivered by the tag printing device 10, the tags 11 are
stacked sequentially on the bottom plate 62 of the
10 stacker 12.

The bottom plate 62 of the stacker 12 has two slide
slots 76 and 76 formed parallel to the feeding direction
of the tags 11 and an engage slot 78 parallel and between
the two slide slots 76 and 76. Each of the two slide
15 slots 76 and 76 are able to engage projecting parts (not
shown) formed on both sides of the lower edge of stopper
plate 64. Since the stopper plate 64 is guided in the
two slide slots 76 and engages with a serrated stopper
member 79 formed on the engage slot 78, it is able to
20 slide parallel to the feeding direction of the tags 11
and, further, to be located in an accurate position.

The marks 89 designate a measure for accurately
locating the stopper plate 64 in position.

The holding member 66 is arranged to hold the tags
25 11 down to the bottom plate 62 from the top and is
provided with a lengthwise extending slot 84 which holds
a guide pin 82. The pin 82 extends through the
lengthwise extending slot 84 on the holding member 66 and
a vertical slot 80 on the stacker housing 60 to connect
30 holding member 66 with the stacker housing 60 such that
the holding member 66 can move in accordance with the
height of the stack of the tags 11.

Furthermore, since the holding member 66 carries the aforementioned pin 82 which, in turn, extends through the lengthwise extending slot 84 formed on the holding member 66, the holding member 66 is able to move in the feeding
5 direction of the tags 11, so that the holding member 66 can hold the stacked tags 11 down with an approximately uniform force pressing on the tag 11 over its entire surface from above thereby helping to prevent the falling over of the stacked tags 11.

10 As shown in Figure 1, the mark applying means 22 for applying the mark on the end surface of the continuous paper 14 that is provided between printing means 18 and cutting means 20, comprises a plurality of ink roller devices 86 and 87 (in the embodiment illustrated in
15 Figure 1 two sets of the ink roller devices 86 and 87 are shown, although it is understood that any number of ink roller devices could be provided). The ink roller devices 86 and 87 each contain ink of a different colour and it is provided that the different colours can be
20 applied separately in accordance with the number of ink roller devices. For example, in the embodiment where two sets of ink roller devices are provided, the ink roller devices may be provided with both red and black ink and can be arranged to mark the tags 11 between printing
25 means 18 and cutting means 20. In an embodiment where three sets of the ink roller devices are provide, the three types of ink roller device may be provided with, for example, red, black and yellow ink colours so that the mark applying means can make marks in the tags 11
30 with three colours.

The ink roller units 86 and 87, as shown in Figure 3, comprise at least a lever member 90, an ink roller 92 and a solenoid 88 which is fixed on a horizontal section

94A of an L-shaped plate 94, which is fixed on a supplemental frame 97 of the tag printing device 10. The lever member 90 is configured with a U-shaped supporting member 90A which carries an ink roller 92 and the lever 5 90B, which is pivotally supported by a pin 96 extending from the vertical section 94B of the L-shaped plate 94. When the plunger 88A of the solenoid 88 is extended it pushes against the lower side of the U-shaped supporting member 90A, the lever member 90 pivots on the pin 96 and 10 rotates in the direction of the arrow B and the ink roller 92 touches the end edge surface 14a of the transported continuous paper 14.

In this embodiment a notch 98 is provided on the horizontal section 94A of the L-shaped plate 94 and the 15 lower side of the pivoting lever 90B connects with inner wall of the notch 98 thereby regulating the rotational stroke of the lever 90B.

By this means, the ink roller 92 is pivoted to come into contact with the end surface 14A of the continuous 20 paper 14. In addition, the spring 100 provides a biasing force on the U-shaped supporting member 90A in the direction away from the continuous paper 14. Therefore, when the plunger 88A of the solenoid 88 is retracted into the solenoid 88, the lever member 90 pivots upon the pin 25 96 in the direction of the arrow A and the ink roller 92 moves away from the continuous paper 14.

When the control means 24 receives an on-line instruction to perform a marking from the computer, the mark applying means 22 is controlled to time the driving 30 of the first and the second ink roller devices 86 and 87 with reference to a predetermined length between the first detecting sensor 50 and each of the ink rolling

devices 86 and 87, and thereby the ink is adhered on the end surface 14A of the continuous paper 14.

Moreover, in the case when a punched hole detecting sensor 102, arranged upstream side of the first detecting sensor 50, detects the punched holes 104 (referring to Figure 4) formed in the continuous paper 14, the printing means 18 and the first and the second ink roller devices 86 and 87 can also be driven as mentioned above.

Specifically, when the punched hole detecting sensor 102 detects the punched hole 104, the signal indicating that the punched hole 104 has been detected is transferred to the control means 24, which causes the printing means 18 not to perform the operation of printing at the part of the continuous paper 14 with the punched hole 104 but, however, causes any one of the ink roller devices 86 and 87 to apply a mark on the end surface 14A of the continuous paper 14.

As shown in Figure 4, the rear end of the existing continuous paper 14 from a roll fed from the feeding reel member 16 and a front end of the fresh continuous paper 14 from the next new roll to be fed from the feeding reel member 16, together form a connecting portion which is connected with a tape 106.

The connection tag 11A corresponding to the connection portion, is formed with a punched hole 104 so as not to be printed by the printing means 18. That is the reason why it is easy to discriminate the connected tag when the tags 11 are stacked in a pile on the stacker 12.

Moreover, the existence of the connecting tag 11A can be identified through the marking of a different position from the position marked in accordance with the instructions received on-line from the computer.

Figure 5 is a block diagram of control means 24 provided on a tag printing device 10 equipped with a stacker 12.

Referring to Figure 5, a CPU (Central Processing Unit) 108 is connected to a ROM (Read-Only Memory) 112 and a RAM (Random Access Memory) 114 through a common bus 110. The ROM 112 has a program memory area 116 and permanent memory areas 118 and 120 in which is stored fixed reference values N1 and N2, respectively, for controlling the solenoid 88. The RAM 114 has at least a printing data memory area 122 and number count memory area for a numbering counter 124 for counting the number of printed tags and a step counter 126 for counting the number of driving pulses (steps) of the pulse motor 52.

Moreover, the first detecting sensor 50 and the second detecting sensor 58 for detecting the tag hole 48 perforated in the continuous paper 14, a printing control circuit 128, a motor driving circuit 130, a flip flop circuit 132 and a data input circuit 134 are also connected to the common bus 110. The solenoid driving circuit 133 is connected to the flip flop circuit 132. The printing control circuit 128 is provided for controlling the thermal transfer head 38 which performs printing on the continuous paper 14 and the motor driving circuit 130 is provided for driving the pulse motor 52.

Data input circuit 134 is connected on-line to the computer 26 which is capable of managing the information relevant to the tags to be produced so that the instruction to perform a marking from the computer is inputted to the data input circuit, for example where there is a change of the printing format or of the end user of the tags or the like.

In this manner, an arrangement to sort the plurality of tags 11 piled up on the stacker 12 is provided, however, classification of the plurality of tags 11 is required not only when the printing formats are changed but also when a change in the end user (clothing, shops etc) or of the number of tags in every delivery to the user is made, even if the printing format of the plurality of tags 11 is the same, and in this case a marking is also required.

Therefore, since the computer 26 can manage the information relevant to the tags 11 to be produced and can also store the variety of information on the products required for every product item to be classified, it is preferable to supply the instruction to perform the application of a mark from the computer so as to enable a mark to be applied in accordance with every various aspect of classification, without a requirement for changing the printing formats.

The mode of operation of the aforementioned tag printing device 10 will now be described.

Rotation of the platen roller 40 by the pulse motor 52 delivers the continuous paper 14 to the feeding passage from the feeding reel member 16, and then, upon delivery of the continuous paper 14 into the feeding passage, the tag holes 48 provided in the continuous paper 14 can be detected by the first detecting sensor 50. After the detected signal is outputted and the pulse motor 52 is driven by the predetermined number of pulses, a check is made that the thermal print head 38 is in the position required to print the information to be printed (equivalent to the first type of the printing formats) on the tags 11 provided on the continuous paper 14, and then the information is printed thereon.

Every time each of the tags 11 is printed in sequence, the numbering counter 124 counts the number of printed tags 11. When the numbering counter 124 reaches the predetermined count equivalent to the predetermined number of tags 11, the printing operation (the printing of the information relating to the first type of the printing formats) is ended, and similarly, the printing operation of the next number of tags 11 (the printing of the information relating to a second type of the printing formats) is then started.

The second detecting sensor 58 detects each of the tag holes 48 provided on the continuous paper 14 that has been printed by the printing means 18.

After the detected signal is outputted, when the pulse motor 52 has been driven through the predetermined number of pulses (steps), a check is made that the cutting means 20 is correctly located at the cutting position between the first tag 11 and the second tag 11 provided on the continuous paper 14, and then the first tag 11 and the second tag 11 are cut off by the cutting means 20. The next tags 11 are cut off in turn, and are then stacked in a pile on the stacker 12.

In the aforementioned printing operation, the instruction to perform the application of a mark supplied from the computer 26 is inputted into the control means 24. In the above-mentioned printing control stage, the marking operation is added in the middle of the aforementioned printing control process.

In that way, the ink roller devices 86 and 87 are operated.

The following explanation is made about the case where an instruction to perform the application of a mark

is outputted from the computer 26 when the printing formats are changed.

Figure 6 shows in particular a format of stored information involved in the operation of control means 24 in the case when, whilst providing printing control, an instruction to perform the application of a mark is required due to a change in the printing format. Two sets of printing data 135 are shown in Figure 6, each relating to types of printing information to be printed on tags 11. Also shown is mark applying data 136 and numbering data 137.

In accordance with operation of a single step of rotation of the pulse motor 52, an interrupt operation is initiated, and it is then checked as to whether it is in step with the output signal provided from the first sensor 50. When the first sensor 50 outputs a signal, step counter 126 is reset. In this state, although the ink roller device 86 is located at a position where the mark can be applied on the end surface 14A of the continuous paper 14, no marking is made at this time, as described later. Marking is made when the value (hereinafter referred to as "count") of the step counter 126 reaches a fixed reference value N1, and marking is ended when the count of the step counter 126 reaches a fixed reference value N2. However, the step counter 126 is advanced one increment in the case where the first detecting sensor 50 does not provide the output signal.

Moreover, a check is made as to whether the count of the step counter 126 coincides with the fixed reference value N1 provided on the permanent memory areas 118 and 120. If the count coincides with the fixed reference value N1, a check is also made during the printing operation as to whether a mark applying data 136

corresponding to the printing data 135 and numbering data 137 is set to logic signal "1". If the mark applying data is set to the logic signal "1", the flip flop 132 is set and then the mark applying data is set to the logic
5 signal "0", whilst setting the solenoid to be activated, so that the ink roller device 86 is in contact with the side end 14A of the continuous paper 14.

Furthermore, the check is made as to whether the count of the step counter 126 coincides with the fixed
10 reference value N2 stored in the permanent memory areas 118 and 120. If the count coincides with the fixed reference value N2, this resets the flip flop 132 to de-energise the solenoid, so that the ink roller device 86 is pivoted away from the side end 14A of the continuous
15 paper 14. In this manner, as the plurality of the tags 11 is stacked in a pile on the stacker 12, a mark M (shown in Figure 1) can be applied on the side end of the tags 11 locating the position where the print formats change, so as to enable the place where the printed
20 formats are changed to be found.

The instruction for performing the application of a mark in response to a change other than a change in the printing formats, such as a change in the end user, basically results in the same operation as previously
25 described.

Therefore, an arrangement of plural ink roller devices 86 and 87 having different ink colours in each thereof of the mark applying means 22 makes it possible that, in the case of different kinds of user, a mark is
30 applied with a red colour on the plurality of tags as a primary classification and in the case of changing the printing formats a mark is applied with a black colour as sub-classification. In this manner an allowance is made

not only to provide a recognisable position but also to classify according to various predetermined settings.

In the present invention, the timing for performing the operation of the printing means and of the cutting means and of mark applying means can be controlled
5 utilising the detection of the tag hole on the tags. By this method, since it is not necessary to make a recess portion on the end surface of the continuous paper, as has been conventional, the application of the mark in an
10 accurate position on continuous paper is possible.

In addition, although the aforementioned embodiments have been illustrated using the example of an ink roller device having different colours which are arranged as mark applying means, it is to be understood that the
15 embodiments are not limited to the specific embodiments thereof and it is possible to adopt inking pads, coloured pencils and felt pens to obtain the appropriate time and length for applying the mark.

A tag printing device according to the present
20 invention having the capability not only to obtain a recognisable position to be classified but also to classify set predetermined information for various purposes when the plurality of tags are piled on the stacker, and also having the capability to apply a mark
25 accurately on the end surface of the continuous paper.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the
30 foregoing specification as indicating the scope of the invention.

Claims

1. A tag printing device for printing onto a continuous tag material feed comprising printing means, cutting
5 means, a sensor for detecting tag holes formed on the continuous tag material feed, a mark applying means capable of applying a plurality of types of mark to the edge surface of the continuous tag material feed and control means for controlling the operation of the
10 printing means, the mark applying means and the cutting means in dependence on the detection of a tag hole.

2. A tag printing device as claimed in claim 1 which is suitable for printing onto continuous paper tag material feed.

15 3. A tag printing device as claimed in claim 1 or claim 2 which is suitable for use with continuous tag material in the form of a reel and which comprises means for mounting a reel.

4. A tag printing device as claimed in any of claims 1
20 to 3 in which the mark applying means is arranged to apply marks in a plurality of colours.

5. A tag printing device as claimed in claim 4 in which the mark applying means comprises a plurality of marking devices, containing inks of different colours.

25 6. A tag printing device as claimed in any of claims 1 to 5 in which the mark applying means is located downstream in the feeding direction of the tag material of the printing means and upstream in the feeding direction of the tag material of the cutting means.

7. A tag printing device according to any of claims 1 to 6 which comprises two or more sensors for detecting tag holes.

5 8. A tag printing device as claimed in any of claims 1 to 7 which comprises a sensor for detecting a punched hole (not being a tag hole) in the tag material feed, the arrangement being such that when a punched hole is sensed the mark applying means applies a mark on the portion of the tag material feed which forms the tag having the
10 punched hole.

9. A tag printing device as claimed in any of claims 1 to 8 which comprises a computer which communicates with the printing device and is arranged to control the mark applying means to apply a mark.

15 10. A tag printing device as claimed in any of claims 1 to 9 in which the tag material feed is driven by drive means comprising a pulse motor and the control means is arranged to count the number of driving pulses of the pulse motor.

20 11. A tag printing device having at least continuous paper in the form of a roll applied to produce a plurality of tags, when the continuous paper is delivered from the feeding reel member, arranged to print predetermined formats onto every tag formed thereon by
25 printing means, and the printed continuous paper having predetermined lengths is cut into suitable lengths for the tags being the distance between detected hole perforations thereon by cutting means, the tag printing device comprising:

30 a mark applying means for applying a mark on the end surface of the continuous paper which is located between the printing means and the cutting means and for enabling

the application of a mark in a plurality of colours; and

a sensor for detecting a tag hole formed on the tags for passing the string through each tag thereon provided in the continuous paper; and

5 controlling means for controlling the drive timing of the printing means, the cutting means and the mark applying means in accordance with the result of detecting the tag hole.

12. The tag printing device according to claim 11,
10 wherein the marking applying means comprises a number of inking devices that have a plurality of ink colours.

13. The tag printing device according to claims 11 or 12, wherein sensors are provided on the upstream near side of the printing means and on the upstream near side
15 of the cutting means.

14. The tag printing device according to claims 11, 12 or 13, further comprising:

a computer for providing integrated management of the information about the tags to be produced, which is
20 on-line with the printing device, and capable of controlling the mark applying means to apply the mark in accordance with instructions from the computer.

15. The tag printing device according to claims 11, 12, 13 or 14, further comprising:

25 a detecting sensor for detecting a punched hole rather than the tag hole formed on the tag, provided on the upstream side of the printing means and, when the punched hole is detected, allowing the mark applying means to be arranged to apply the mark on the tag
30 provided with the punched hole.