

METHOD OF MANUFACTURING DESIGN TAB END
USING PILOT HOLE OF TAB COIL

Field of the Invention

5 The present invention relates to a method for manufacturing a designed tab end using a pilot hole of a tab coil, and more particularly, to a method for manufacturing a designed tab end using a pilot hole of a tab coil which can precisely print a design on a target position of the tab formed on a beverage can.

10 Background of the Invention

A beverage can is generally used with the advantages that the beverage is able to be preserved for a long period of time and it can be used easily, and the beverage can is used for containing soda water, fruit beverage, mixed beverage as well as beer. The beverage can is generally comprised of a cylindrical body made of metallic material
15 such as steel or non-iron metallic material such as aluminum, and an aluminum end seamed on the upper side of the body. The aluminum end is formed with a score line so that the opening of the beverage can is torn easily. Further, a tab for opening the beverage can by pushing the score line is joined on the end.

In order to drink the contents in the beverage can, the score line formed on the
20 end has to be torn by pulling the tab. Then, the beverage in the can is discharged from the outlet formed by the torn score line, so a man can drink the beverage conveniently.

The present invention is related to the manufacturing method for manufacturing a designed tab end of the beverage can that can function as an ornament by applying a design on the tab joined on the end, where the design includes a logo of the beverage
25 brand, an image, advertising words, a suggestive word about the property of the product,

a variety of animation characters for the promotion of the product, a caricature of a figure, an image of a fruit in case of a fruit beverage, a logo and a mascot of a sports game, or a logo and a trademark of a company.

As an example of a method of manufacturing a designed tab end, in beverage
5 cans, Korean Patent Application No. 2001-8020 filed and published by the same
assignee on Feb. 17 2001 discloses a method for manufacturing a designed tab end by
carrying out a tab base color painting process on a tab coil, carrying out a design
applying process and a varnishing process and putting the tab into a tab formation
process and a conversion pressing process, a stacking process, using a pitch aligning
10 device.

Also, Korean Patent Application No. 10-2001-43268 filed by the same assignee
on July 18 2001 discloses a design printing phase adjusting apparatus using a print roll
tolerance sensor.

In the above designed tab end formation and manufacturing methods, a design to
15 be printed on the tab coil must be printed in the same interval as the tab formed in a
conversion press after the printing process, so that the printed design can be precisely
positioned on a sealed- head portion of a target finger hole.

However, in the process of printing a design on the tab coil, fine errors in the
intervals of design prints are gradually increased from the initial stage of printing due to
20 the tolerance between prints and the tolerance of a print cylinder roll. Thus, when
printing a design of more than a predetermined length, the position of print is deviated
from an allowable range, thereby lowering the value of a product. Also, the tab coil
must be arranged and put into a conversion press, which may require a long period of
time to manufacture a tab.

25 In a pilot hole for a tab coil and a design printing phase controller without a

guide such as a pilot hole in design printing phase alignment and tab formation using the same, after printing a design on a tab coil with a length of several kilometers, the position of the printed design is deviated from the target position of the formed tab when forming the tab coil of more than a predetermined length.

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SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a method for manufacturing a designed tab end using a pilot hole of a tab coil in which a pilot hole is previously punched prior to the printing process, a corresponding design is printed
10 precisely on a target position using a pilot hole sensor and a gear set to the pitch of the pilot hole, remove a pilot punch from a conversion molding set, form a tab according to a previously punched interval by applying only the pilot pin, and print a desired design precisely on the target position of the tab head portion.

The present invention provides a method for manufacturing a designed tab end
15 using a pilot hole of a tab coil, which can print a design precisely on the upper surface of a tab for opening a discharge outlet of a beverage can and attach the tab on the can, comprising the steps of: punching a pilot hole on a tab coil in the same pitch as that of a conversion press prior to design printing; flatly reforming a projected portion formed on the bottom of the punched tab coil; washing and drying the tab coil; inputting the tab
20 coil into a printer according to the pitch of the pilot hole; detecting the pilot hole of the tab coil inputted into the printer; controlling a color controller so that a design can be printed on the detected target position of the tab coil; printing the design on the tab using a print roll controlled by the color controller; pulling the design-printed coil according to the pitch of the pilot hole; drying the design-printed coil in order to input it
25 into the varnish coating process; winding the resulting design tab coil; loading the

wound design tab coil on an uncoiler of a conversion press for tab formation and then inputting it into the conversion press at a predetermined speed; forming the designed tab coil fed to the conversion press as a tab forming mold set; and attaching a shell supplied into the conversion press to the design tab formed after the second shell processing of
 5 the conversion press.

Preferably, in the tab formation step, a tab is formed in the same pitch as the pitch punched in the pilot hole punching press by a pilot pin left after removing a pilot punch from the tab forming mold set.

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BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a side view illustrating an apparatus for manufacturing a designed tab end using a pilot hole of a tab coil according to a preferred embodiment of the present invention;

Fig. 2 is a view showing a design print phase alignment device using the pilot
 15 hole of the tab coil according to the preferred embodiment of the present invention; and

Fig. 3 is a flow chart showing a method for manufacturing a designed tab end using a pilot hole of a tab coil according to the preferred embodiment of the present invention.

* Explanation of reference numerals for main elements of the drawings *

20	10: uncoiler	11: tab coil feeder
	12: tab coil connector	13: pilot hole punching press
	14: washer	15: drier
	16, 16': infeeding and outfeeding tensioners	21: pilot hole punch
	22: pilot pin	23: reform punch
25	30: design printer	31: register punch

32: register controller

33: phase alignment motor

34: gear box

35: printing roller

36: offset roller

37: clean roller

40, 40': infeed, outfeed

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 is a side view illustrating an apparatus for manufacturing a designed tab end using a pilot hole of a tab coil according to a preferred embodiment of the present invention; and Fig. 2 is a view showing a design print phase alignment device using the pilot hole of the tab coil according to the preferred embodiment of the present invention.

Referring to these drawings, before performing a printing process, a tab coil is mounted on an uncoiler 10 and is wound in a roll shape in order to precisely make the pitches of design printing and tab formation the same. The roll shaped tab coil is inputted into a pilot hole punching press 13 through a tab coil feeder 11 at a predetermined speed, thus punching a pilot hole with a predetermined shape and a predetermined interval.

At this time, in order to continuously print the tab coil, before inputting the tab coil into the pilot hole punching press 12, two coils are connected by a tab coil connector 12 and then are continuously inputted into a pilot hole punching press 13.

From the viewpoint of one-lane tab formation, the pilot hole punching press 13 is provided with a tab coil pilot hole punching mold set, being consisted of a pilot punch 21, a plurality of pilot pins 22 positioned in a continuous straight line and a reform punch 23 for flattening a protruded portion that may be formed on the bottom of a tab coil punched by the above-mentioned pilot punch 21. At this time, the pilot hole punch 21, each of the pilot pins 22 and the reform punch 23 are plurally provided in parallel

according to the number of lines of the tab coil to be printed.

The tab coil punched by the pilot hole punching press 13 is washed by a washer 14 and is dried by a dryer 15, and thereafter is inputted into a design printer 30 for printing process, thus printing a design on the tab coil.

5 At this time, in order to apply the printed design in the process of forming a tab by a conversion press, a pilot hole is detected by a pilot hole sensor 31 so that a finger hole portion can be positioned precisely on a flat seamed head portion of the tab.

A print phase alignment device includes a register controller 32 for allowing a design to be printed at a precise position when the position of the pilot hole is detected,
10 a printing roller 36 for driving a gear in a gear box 34 upon receipt of a control signal of the register controller 32, and a phase alignment motor 33 for aligning the target position of a design to be printed with the precise position between the pre-punched pilot holes by rotating or reverse rotating an offset roller 37.

At the same time, in order to print a target design on a tab coil at a
15 predetermined interval using the above-mentioned pilot hole, a meshed type infeeders 40 used right before the design printing step and a meshed type outfeeder 40' used right after the design printing step are interlocked with each of printing rollers.

Meanwhile, for obtaining a plurality of design colors of more than one figure, the surface of the tab coil is dried by a drier 35 after each printing process is completed,
20 and then a color printing process is performed. After the design printing process is completed, a varnish coating process with a varnish coating machine 50 is performed on the surface of the tab coil and then a drying process with a drying furnace 60 for hardening the printed surface is performed thereon, in order to minimize the generation of a scratch on the design during formation, transfer and distribution.

25 After the drying process is completed, the tab coil printed with a design is kept

to have a constant tensile force by an outfeeding tensioner 16', is outputted at the same height all the time by a deflector roll 70 and is wound again by a winder 80. Thereafter, it is mounted on an uncoiler of a conversion press for the purpose of tab formation and then a tab is formed by the conversion press.

5 At this time, the design printed on the tab coil is positioned at a target portion of the tab all the time to thus form the tab, so that the pilot hole of the tab coil, which is previously punched by a pilot hole punching press 13 before the printing process without performing the pilot punching process of the conversion press, can be located in the same position as in tab formation by a pilot pin 22 of the conversion press.

10 Also, a plurality of pilot pins are provided, so that the pilot hole of the tab coil, which is previously punched by a pilot hole punching press 13 before the printing process without performing the pilot punching process of the conversion press, can be located in the same position as in tab formation of the conversion press.

 The method for manufacturing a designed tab end using a pilot hole of a tab coil
15 according to the preferred embodiment of the present invention will now be described with reference to the accompanying drawings.

 Fig. 3 is a flow chart showing a method for manufacturing a designed tab end using a pilot hole of a tab coil according to the preferred embodiment of the present invention.

20 Firstly, in the method for manufacturing a designed tab end using a pilot hole of a tab coil, a pilot hole is punched on a tab coil in the same pitch as that of a conversion press before design printing (a first step: ST-1).

 Then, a projected portion formed on the bottom of the punched tab coil is reformed flatly (a second step: ST-2).

25 After the reforming, the tab coil is washed and dried (a third step: ST-3).

The dried tab coil is inputted into a printer 30 according to the pitch of the pilot hole (a fourth step: ST-4). The pilot hole of the inputted tab coil is detected (a fifth step ST-5).

5 A printing process is performed on the detected target position of the tab coil. In this printing process, a color controller is controlled so that a design can be printed on the detected target position of the tab coil and a design printing is performed by a print roll controlled by the color controller (a sixth step: ST-6).

After the printing, a design-printed coil is pulled according to the pitch of the pilot hole and the coil is dried in order to input the design-printed coil into the varnish
10 coating process (a seventh step: ST-7).

Then, the dried tab coil is wound (an eighth step: ST-8).

For formation of the tab coil, the wound designed tab coil is loaded on the uncoiler of a conversion press and then is inputted into the conversion press at a predetermined speed (a ninth step: ST-9).

15 The designed tab coil fed into the conversion press is formed as the tab forming mold set. A tab is formed in the same pitch as the punched pitch in the pilot hole punching press by a pilot pin left after removing a pilot punch from the tab forming mold set (a tenth step: ST-10).

And, a shell supplied to the conversion press is attach to the designed tab formed
20 after the second shell processing of the conversion press (an eleventh step: ST-11).

Meanwhile, although the preferred embodiment of the present invention has been described, it will be understood by those skilled in the art that the present invention should not be limited to the described embodiment, but various changes and modifications can be made within the spirit and the scope of the present invention.

INDUSTRIAL APPLICABILITY

In the method for manufacturing a designed tab end using a pilot hole of a tab coil according to the present invention, it is possible to prevent the deviation of the design position from a target position during tab formation due to the accumulation of tolerances in a printing work by punching a pilot hole on a tab coil in the same pitch as in the tab formation process of the conversion press in the initial stage process prior to design printing. Particularly, it is possible to prevent production interruption due to the realignment of the tab coil by processing the pilot hole on the previously punched tab coil in the same way as in the printing process and the tab formation process of the conversion press. Accordingly, the present invention enables a fine design printing and prevents the reduction of productivity due to work interruption.

What Is Claimed Is:

1. A method for manufacturing a designed tab end using a pilot hole of a tab coil, which can print a design precisely on the upper surface of a tab for opening a discharge outlet of a beverage can and attach the tab on the can, comprising the steps of:
 - 5 punching a pilot hole on a tab coil in the same pitch as that of a conversion press prior to design printing;
 - flatly reforming a projected portion formed on the bottom of the punched tab coil;
 - 10 washing and drying the tab coil; inputting the tab coil into a printer according to the pitch of the pilot hole;
 - detecting the pilot hole of the tab coil inputted into the printer;
 - controlling a color controller so that a design can be printed on the detected target position of the tab coil;
 - 15 printing the design on the tab using a print roll controlled by the color controller;
 - pulling the design-printed coil according to the pitch of the pilot hole;
 - drying the design-printed coil in order to input it into the varnish coating process;
 - winding the resulting design tab coil;
 - 20 loading the wound design tab coil on an uncoiler of a conversion press for tab formation and then inputting it into the conversion press at a predetermined speed;
 - forming the designed tab coil fed to the conversion press as a tab forming mold set; and
 - attaching a shell supplied into the conversion press to the design tab formed after
 - 25 the second shell processing of the conversion press.

2. The method of claim 1, wherein, in the tab formation step, a tab is formed in the same pitch as the pitch punched in the pilot hole punching press by a pilot pin left after removing a pilot punch from the tab forming mold set.

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