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(54) **CHART PRINTING, CUTTING, AND BORING MACHINE THAT ALLOWS CONTINUOUS PRODUCTION ON A SINGLE LINE**

(57) The invention is a chart printing machine (100) consisting of a main body (110) to which components are connected, an inlet unit (101) to which the chart's raw material is connected, a peel heater (102) for softening and peeling of the stretch on the surface of the raw material, a printing unit (104) on which the chart is printed, a drying oven (105) for drying printed areas, and heating cylinders (106) to heat the printed PVCs for easy cutting;

characterized by comprising a cutting unit (107) for performing the cutting process by being connected to the main body, a deburring member (108) which is connected to the main body to wrap the carrier burrs found on the edges of the cut products, and a cutting element (107.1) providing continuous cutting and sizing by being connected to the cutting unit.

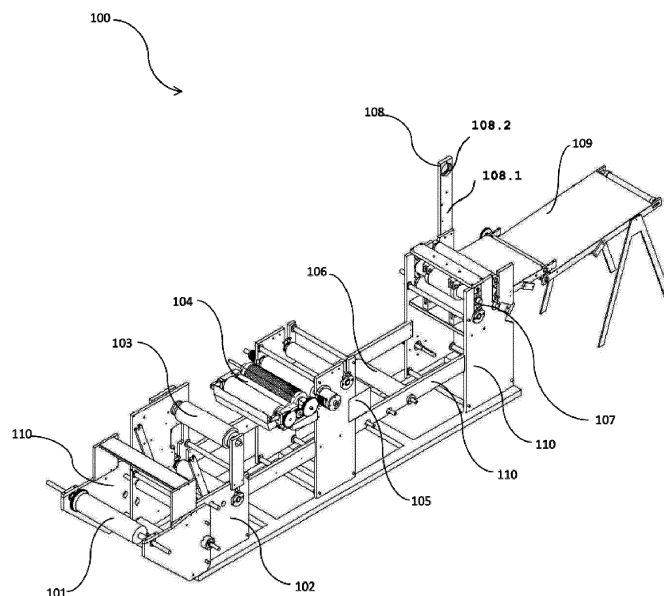


Figure 1

Description

Technical Field

[0001] The invention relates to a chart printing, cutting, and boring machine that is used in the preparation of PVC color chart and sample sets generally used in wood and PVC manufacturing sectors.

[0002] The invention particularly relates to a chart printing, cutting, and boring machine that allows the whole chart manufacturing process on a single line in a continuous manner.

Background of the Invention

[0003] Today, there is a protective stretch on the coil used as raw material in classical chart manufacturing process. The protective stretch on the coil used during production is sized as a coil layer by peeling off. Printing and cutting cannot be performed because there is a rotation problem in the last remained 50-60 meters of the coil products as a result of sizing.

[0004] In the chart printing machines used in the present technique, printing is carried out by offset printing technique. After printing process, cutting process is performed in a separate machine with a sheet blade. The lifetime of sheet blade used in cutting process is 70-80 thousand charts even under the best conditions and then it blunts, thereby causes additional blade cost.

[0005] In the known art, cut products are sorted out by manpower. During sorting out, cutting precision of the cutting machine is not regular. Therefore, the sorted products can drift away or are not separated from the cut; this causes large amounts of wastage. The bores of the sorted products are dropped and pin holes are opened, then color chart is formed by blending technique. This extra process for opening pin holes of the sorted products leads to loss of time. Approximately 15% of the total production time is required.

[0006] In the present technique, a minimum of 5%-7%, 30% in total, product loss occurs in each station during these processes and additionally, use of the 50-60 meters at the end of the coil is quite difficult, generally impossible. Daily cut amount of chart is only 50-60,000 units when printing and cutting amounts are calculated over 8 hours.

[0007] In the patent search of the prior art, according to the technical content of the patent application TR2008/01773, the invention relates to an automatic chart series machine in textile sector, which aligns and attaches fabrics or wall papers on a surface by folding or lying flat for the purpose of exhibition. The feature of the invention is that it consists of a jaw group, in which a direction change cylinder passes between a pressure roll with rubber on its surface material and a feed roller driven by a motor, wherein all of these are fixed to each other by a different surface material, a saw, a saw motion motor, safety photocell to control the movement of the saw,

and a body on a platform.

[0008] As a consequence, developments have been performed in the chart printing machines; thus, there is a need for new structuring which will remove the above mentioned disadvantages and deliver new solutions to the existing systems.

Description of the Invention

[0009] The present invention relates to a chart printing machine which meets the above-mentioned requirements, eliminates all disadvantages, and brings some additional advantages.

[0010] The main object of the invention is to provide the entire chart production process on a single line in a continuous manner with a minimum loss of 3%-5%.

[0011] One of the objects of the invention is to allow the use and printing and cutting of the remaining last 50-60 meters that cannot be used due to rotation problems of the coil products used as raw materials.

[0012] Another object of the invention is to prevent time and labor loss in the production by providing the cutting process to be carried out continuously on a single line without having to be performed on another machine.

[0013] Another object of the invention is to prevent additional blade cost by way of performing the cutting process via the cutting unit on the same machine.

[0014] Other object of the invention is to decrease the number of faulty products due to the high cutting precision of the cutting unit and thereby, to eliminate economic, time, and labor losses by preventing the loss of raw materials.

[0015] Other object of the invention is to remove extra time and workforce required for opening pin holes by performing that process during cutting.

[0016] Other object of the invention is to prevent raw material wastes by avoiding leaving pvc unnecessarily between each chart by ensuring the production without a need to leave space between the products by means of continuous cutting and sizing with a pantographic blade.

[0017] Another object of the invention is to obtain the charts at the outlet of the continuous blade, in the manner that they are sorted and that their holes are cut.

[0018] Other object of the invention is to increase the daily chart production three-four times.

[0019] Another object of the invention is to perform all processes in a single line and also to decrease economic losses and labor costs by means of reducing the production losses to a minimum at each stage.

[0020] Other object of the invention is to eliminate the use of pvc by 5 mm more than the size of the chart by avoiding spaces between products in classical production process.

[0021] In order to carry out all the advantages that are mentioned above and will be understood from the following detailed description, the present invention is a chart printing machine consisting of a main body to which com-

ponents are connected, an inlet unit to which the chart's raw material is connected, a peel heater for softening and peeling of the stretch on the surface of the raw material, a printing unit on which the chart is printed, an UV drying oven for drying printed areas, and heating cylinders to heat the printed PVCs for easy cutting; wherein characterized by comprising a cutting unit for performing the cutting process by being connected to the said main body, a deburring member which is connected to the main body to wrap the carrier burrs found on the edges of the cut products, and a cutting element providing continuous cutting and sizing by being connected to the said cutting unit.

[0022] Structural and characteristic features and all advantages of the invention will become apparent via the below drawings and detailed description that is written by making reference to these drawings. Therefore, the evaluation should also be performed by taking these drawings and detailed description into account.

Description of the Drawings Helping to Understand the Invention

[0023]

Figure-1; is a perspective view of the chart printing, cutting, boring machine of the invention.

Figure-2; is a detailed perspective view of the chart printing, cutting, boring machine of the invention.

Figure-3; is a close-up view of the cutting element.

Reference Numbers

[0024]

100-	Chart printing machine
101-	Inlet unit
102-	Peel heater
103-	Wrapping shaft
104-	Printing unit
105-	Drying oven
106-	Heating cylinder
107-	Cutting unit
107.1-	Cutting element
107.1.1	Circular drills
107.2	Cutting drum
107.3	Mounting bracket
107.4	Bedding member
108-	Deburring member
108.1	Body
108.2	Deburring gap
109-	Product discharge conveyor
110-	Main body
111-	Mounting channel

Detailed Description of the Invention

[0025] Figure-1 shows the perspective view of the chart printing machine (100) of the invention. The invention allows the chart production process on a single line in a continuous manner.

[0026] Figure-2 shows the detailed perspective view of the chart printing machine (100) of the invention. In the invention, there is a main body (110), to which components are connected. There is an inlet unit (101) to which the roll-shaped coil, which is the raw material of the charts to be produced, is connected. Softening and peeling of the stretch on the surface of the raw material are provided by a peel heater (102). After peeling of the protective stretch on the surface of the product, the wrapping shaft (103) allows reusing the stretch. There is a printing unit (104) on which the chart is printed. In the charts produced in the said printing unit (104), flexo printing technique, which is the most suitable technique to make it easier to hold the print on the raw material printing surface, is used. During printing, ultraviolet based paint is used. There is a printing UV drying oven (105) used for drying printed areas on the printed products. An ultraviolet-printing UV drying oven is selected as the drying oven (105), which is suitable for drying prints made with ultraviolet-based paint. There are heating cylinders (106) which allow the printed charts to be heated for easy cutting.

[0027] Figure-3 shows the close-up view of the cutting element (107.1). The flat cutting elements (107.1) and the circular drills (107.1.1) are formed on the cutting drum (107.2). Flat and shaped cutting elements (107.1) make a circumferential cut continuously along the length and the circular drills (107.1.1) make drilling on the product.

[0028] There is a cutting unit (107) for performing the cutting process by being connected to the said main body (110). The cutting element (107.1) provides continuous cutting and sizing by being connected to the said cutting unit (107). The said cutting element (107.1) is selected as a pantographic blade to provide the application of the continuous cutting technique by reducing the wastes in the products. Four to five million cutting can be performed with the said pantographic continuous blade. It also includes a cutting element (107.1) selected as a pantographic blade and configured on the cutting drum (107.2). On the other hand, mounting brackets (107.3) for securing the said cutting element (107.1) onto the cutting drum (107.2) are connected to the main body (110) profiles via welding and connecting elements. There is a deburring member (108) which is connected to the main body (110) to wrap the carrier burrs found on the edges of the cut products. This deburring member (108) comprises a structured body (108.1) at the vertical axis to the surface and at least one deburring gap (108.2) formed on this body (108.1). The charts passing through the said deburring member (108) are already cut and sorted. There is a product discharge conveyor (109) for easy collection of these cut and sorted products. The said cutting unit

(107) is fixed to the mounting channel (111) of the main body (110) by means of bedding members (107.4) in the x-axis.

[0029] The operating logic of the chart printing machine (100) of the invention is as follows:

The cut PVC coil that will be used as a raw material for the production of the chart is connected to the inlet unit (101). The PVC coil in roll is opened and the protective stretch thereon is easily peeled off by heating via a peel heater (102). The stretch separated from the PVC is wrapped onto the wrapping shaft (103) in order to be reused later. The print-ready PVC enters code printing in the flexo printing unit (104) and printing is performed. The drying of the printed surfaces is provided by ultraviolet drying via the drying oven (105) at the outlet of the printing unit (104). Before cutting process, heating cylinders (106) heat the PVC for easy cutting. Cutting of the PVC in the cutting unit (107) is performed by the cutting element (107.1). After cutting, the edge burrs are separated via the deburring member (108) by wrapping. Thus, deburring process is performed. The charts with the burrs removed accumulate on the product discharge conveyor (109). The products are collected from the product discharge conveyor (109) and coupled by collating and attaching pins.

Claims

1. A chart printing machine (100) consisting of a main body (110), an inlet unit (101) configured on this main body (101), to which the chart's raw material is connected, a peel heater (102) for softening and peeling of the stretch on the surface of the raw material, a printing unit (104) on which the chart is printed, and a drying oven for drying printed areas; **characterized in that** it comprises:

- heating cylinders (106) to heat the printed PVCs,
- a cutting unit (107) configured on the said main body (110) for performing the cutting process of PVC material, and
- cutting elements (107.1) providing continuous cutting and sizing by being connected to the said cutting unit (107).

2. The chart printing machine (100) according to claim-1, **characterized in that** it comprises a product discharge conveyor (109) for easy collection of the cut and sorted products.

3. The chart printing machine (100) according to claim-1, **characterized in that** it comprises a cutting element (107.1) selected as a pantographic blade and configured on the cutting drum (107.2).

4. The chart printing machine (100) according to claim-1, **characterized in that** it comprises a cutting element (107.1) having flat cutting elements (107.1) and circular drills (107.1.1) that are configured on the cutting drum (107.2).

5. The chart printing machine (100) according to claim-1, **characterized in that** it comprises mounting brackets (107.3) for securing the said cutting element (107.1) onto the cutting drum (107.2).

6. The chart printing machine (100) according to claim-1, **characterized in that** it comprises a cutting unit (107) which is fixed to the mounting channel (111) of the said main body (110) by means of bedding members (107.4) in the x-axis.

7. The chart printing machine (100) according to claim-1, **characterized in that** it comprises a deburring member (108) which removes the burrs on the edges of the cut products.

8. The chart printing machine (100) according to claim-7, **characterized in that** the deburring member (108) comprises a structured body (108.1) at the vertical axis to the surface and at least one deburring gap (108.2) formed on this body (108.1).

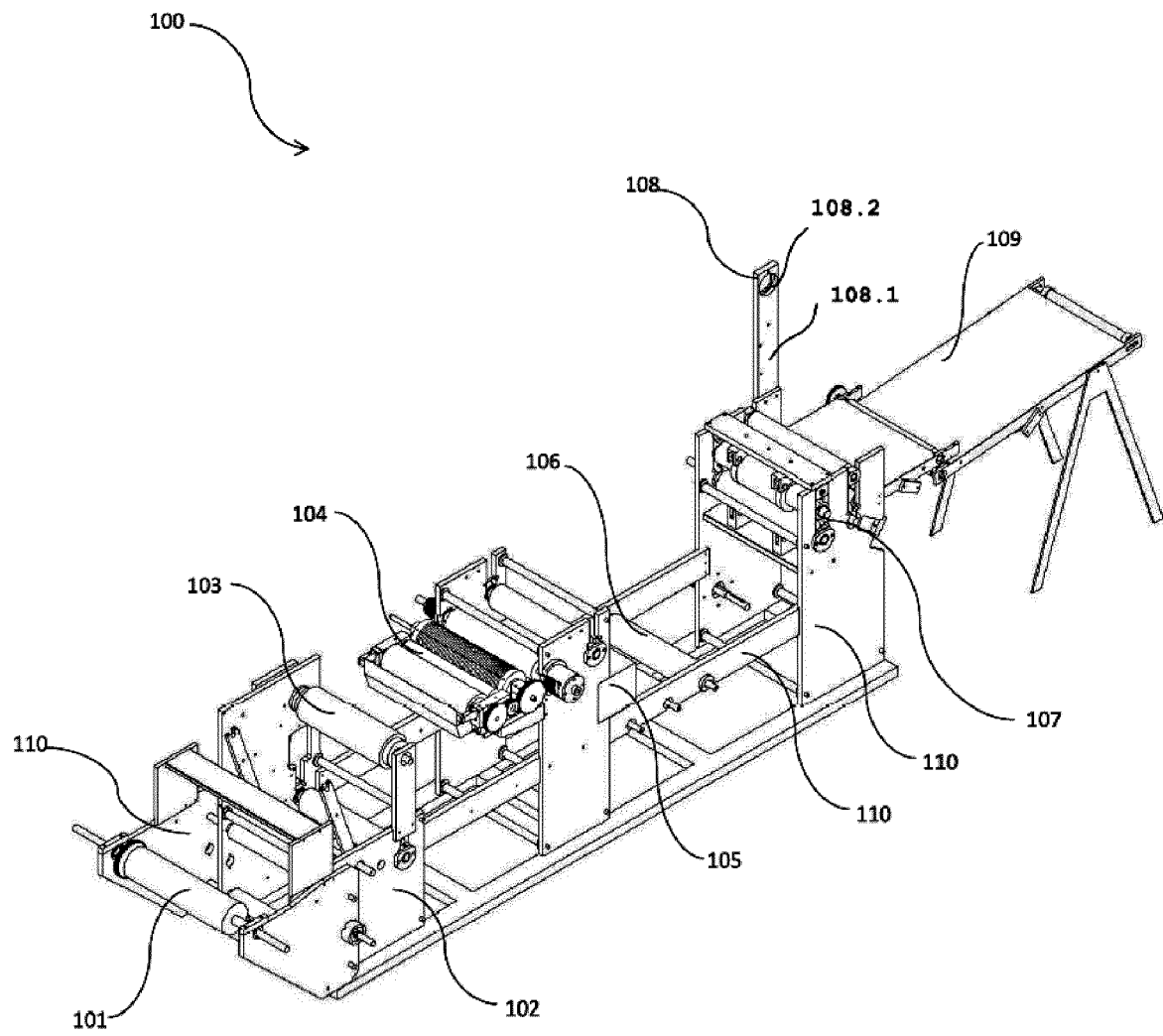


Figure 1

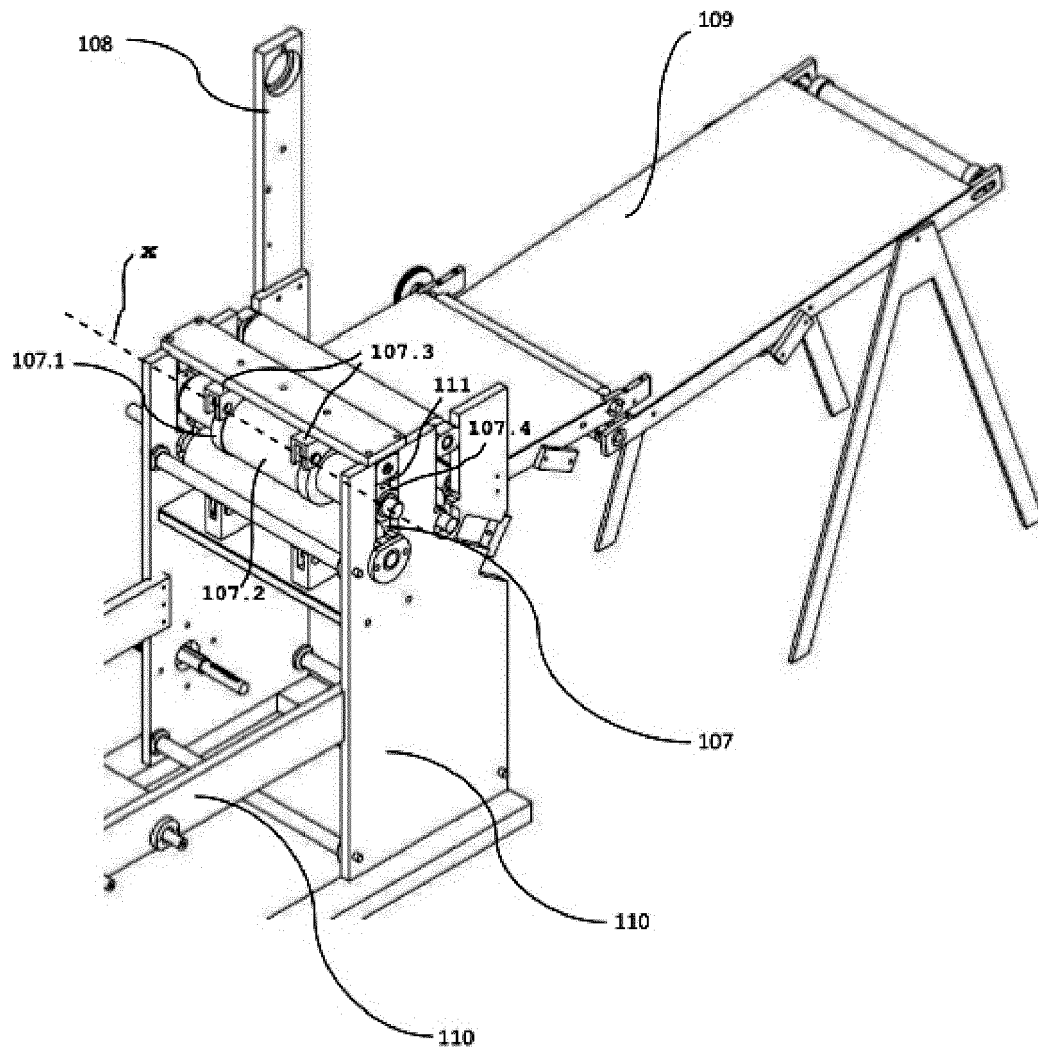


Figure 2

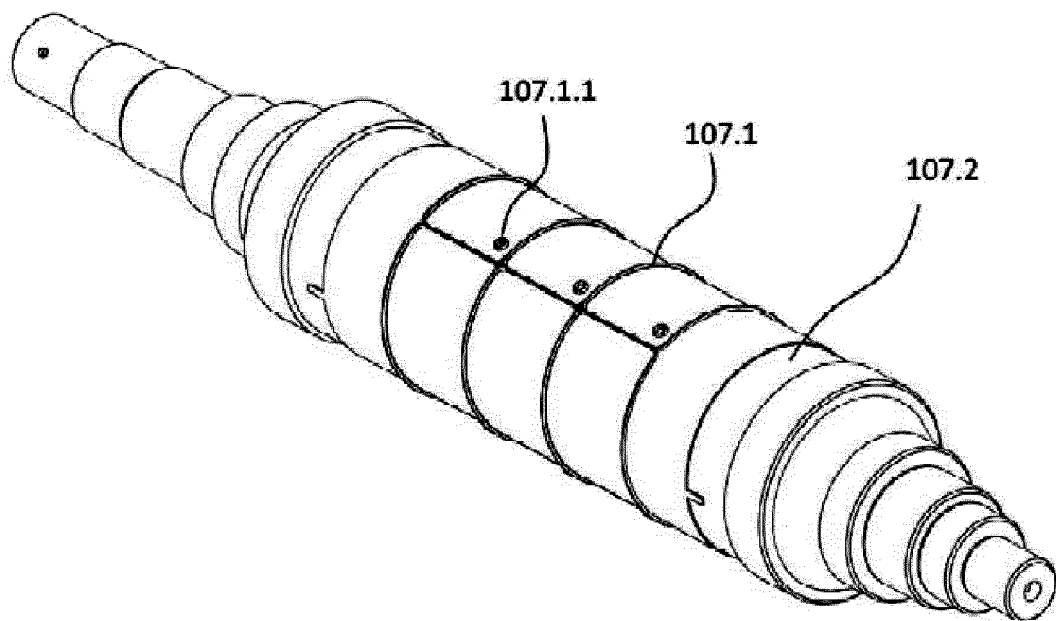


Figure 3



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Application Number
EP 17 17 3170

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Place of search Munich		Date of completion of the search 13 December 2017	Examiner Hajji, Mohamed-Karim
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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