

# **WINDOW BLIND ACCESSORY PROCESSING EQUIPMENT AND PROCESSING METHOD USING SAME**

## **BACKGROUND OF THE INVENTION**

### **5 1. Field of the Invention**

The present invention relates to window blind accessory technology and more particularly, to a window blind accessory processing equipment and a processing method using the window blind accessory processing equipment.

### **2. Description of the Related Art**

10 Generally, after the window blind slats are manufactured and formed, the formed materials are conveyed to the processing unit through the conveying unit for processing procedures such as punching and cutting, before being assembled with other parts (such as ladder belts). For the foregoing process, the material is first continuously pushed to the processing unit by the lead-out wheel of the conveying unit,  
15 and then the material underneath is punched and cut by the processing unit to obtain the finished slats. Then start the conveying unit again, so that the conveying unit pushes the next piece of material, and the operation is repeated.

However, in the aforementioned process, if the conveying unit and the processing unit's conveying production speed are inconsistent, in addition to being  
20 easily damaged, the material will also be squeezed or pulled during the conveying process, which will affect the production quality and yield of the slats.

## **SUMMARY OF THE INVENTION**

The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a window blind accessory  
25 processing equipment, which can ensure that the front-end speed and the rear-end

speed of the equipment are consistent without braking or stopping, so as to avoid the accessories being pulled or squeezed during the processing process, thereby improving production efficiency.

To achieve this and other objects of the present invention, a window blind  
5 accessory processing equipment of the present invention comprises a conveying unit, a processing unit, a speed counting unit, and a control unit. The conveying unit comprises a first lead-out wheel and a second lead-out wheel that are set up and down relative to each other, The first lead-out wheel and the second lead-out wheel are used to continuously push the material forward. The processing unit comprises a worktable  
10 and a sheet-leading wheel set. The worktable comprises a cutting machine. The sheet-leading wheel set is located at a front side relative to the worktable and used to guide the material from the conveying unit to the worktable. The speed counting unit comprises a sensor. The sensor is coaxially arranged on the first lead-out wheel of the conveying unit to sense the rotation of the first lead-out wheel and output a  
15 corresponding sensing signal. The control unit is electrically connected to the speed counting unit. The control unit receives the sensing signal of the sensor and obtains the rotation amount of the first lead-out wheel according to the sensing signal. The control unit controls the sheet-leading wheel set to rotate at the same speed to guide the sheet-leading material to enter the worktable at a consistent speed for cutting, so that  
20 the material that has been cut out forms an accessory.

It can be seen from the above that the window blind accessory processing equipment of the present invention can realize the effect of processing the material into multiple accessories without braking or stopping the material. There is no need to adjust the production rate of each unit individually to achieve the effect of making the  
25 material into multiple accessories at a consistent processing speed, so as to simplify the

processing process and improve production efficiency. To adjust the processing rate of the accessory, just adjust the parameter setting of the control unit, and the conveying unit and the processing unit can move forward at the same rate at the same time.

Preferably, the first lead-out wheel of the conveying unit is a driving wheel,  
5 and the second lead-out wheel is a driven wheel.

Preferably, the sheet-leading wheel set of the processing unit comprises a servo motor sheet-leading wheel and a sheet-leading driven wheel set up and down relative to each other. The control unit controls the servo motor sheet-leading wheel to rotate at the same speed as the first lead-out wheel.

10 Preferably, the sensor of the speed counting unit is an encoder.

Preferably, the worktable of the processing unit further comprises a punching machine located between the sheet-leading wheel set and the cutting machine.

Preferably, the window blind accessory processing equipment further comprises a collection tank located at a rear side relative to the processing unit and  
15 used to collect the accessories.

Preferably, the window blind accessory processing equipment further comprises a pneumatic cylinder set between the processing unit and the collection tank, a pressure wheel connected to the pneumatic cylinder and a sheet-leading driving wheel set opposite to the pressure wheel. The sheet-leading driving wheel is  
20 electrically connected to the control unit, so that the sheet-leading driving wheel is controllable by the control unit to rotate at the same speed as the first lead-out wheel to guide one accessory to the collection tank at a consistent speed.

It is another object of the present invention to provide a window blind accessory processing method by using the above-mentioned window blind accessory  
25 processing equipment. The window blind accessory processing method comprises the

steps that firstly, the first lead-out wheel and the second lead-out wheel continue to push the material forward, then as the material continues to advance, the sensor senses the rotation amount of the first lead-out wheel and outputs a corresponding sensing signal to the control unit, and then the control unit obtains the rotation amount of the  
5 first lead-out wheel according to the sensing signal and controls the sheet-leading wheel set to rotate at the same speed to transport the material to the processing unit to cut the material, so that the cut material forms an accessory.

Preferably, when the material advances to the worktable for cutting and punching, the sheet-leading driving wheel pushes the accessory thus made forward,  
10 and the control unit controls the sheet-leading driving wheel to rotate at the same speed as the first lead-out wheel, and guides one accessory to the collection tank together with the pressure wheel contacting the accessory.

The detailed structure, characteristics, assembly or use method of the window blind accessory processing equipment and processing method using the  
15 window blind accessory processing equipment provided by the present invention will be described in the detailed description of the subsequent preferred embodiment. However, those with ordinary skill in the art of the present invention should be able to understand that the detailed descriptions and the specific preferred embodiment listed in the implementation of the present invention are only used to illustrate the present  
20 invention and are not intended to limit the scope of the patent application of the present invention.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a schematic structural plan view of a window blind accessory processing equipment according to the present invention.

25 FIG. 2 is a block diagram of the window blind accessory processing

equipment according to the present invention.

## **DETAILED DESCRIPTION OF THE INVENTION**

The applicant first explains here, in the entire specification, including the preferred embodiment and the drawings, the terms related to directionality are based  
5 on the directions in the drawings. Second, in the embodiment and the drawings to be described below, the same component numbers represent the same or similar components or their structural features.

Referring to FIGS. 1 and 2, a window blind accessory processing equipment  
10 **10** in accordance with the present invention comprises two conveying units **20** arranged front and rear, a processing unit **30**, a speed counting unit **40**, and a control unit **50**.

Each conveying unit **20** comprises a first lead-out wheel **22** and a second lead-out wheel **24**, respectively. The first lead-out wheel **22** and the second lead-out wheel **24** are set up and down relative to each other. The first lead-out wheel **22** and  
15 the second lead-out wheel **24** are respectively pressed on the top and bottom surfaces of a piece of material **12** extruded through the plastic extrusion process. The first lead-out wheel **22** is a driving wheel, which can be driven by a power source **60** (such as a lead-out motor) to rotate. The second lead-out wheel **24** is an unpowered driven wheel, When the material **12** is moving forward, it rotates in the opposite direction to  
20 the first lead-out wheel **22** to continuously push the material **12** to the processing unit **30**. The window blind accessory processing equipment **10** of the present preferred embodiment uses one set of first lead-out wheel **22** and second lead-out wheel **24** arranged opposite to each other as an example (it can also be one or more sets according to operation requirements).

25 The processing unit **30** comprises a worktable **31** and a sheet-leading wheel

set **32** arranged in front of the worktable **31**. The sheet-leading wheel set **32** guides the material **12** of the conveying unit **20** to the worktable **31** for processing. In detail, the worktable **31** comprises a punching machine **35** for punching the material **12** and a cutting machine **36** for cutting the material **12**. The sheet-leading wheel set **32** comprises a servo motor sheet-leading wheel **33** and a sheet-leading driven wheel **34**. The punching machine **35** and cutting machine **36** are set in tandem. The servo motor sheet-leading wheel **33** and the sheet-leading driven wheel **34** are set up and down to face each other, and rotate in the opposite direction, and push the material **12** into the punching machine **35** for punching, and then advance to the cutting machine **36** for cutting into a curtain accessory (such as window blind slat). Since the punching machine **35** and the cutting machine **36** are both conventional technologies and not the focus of this invention, the detailed structure and operating principle will not be repeated here.

It should be noted that the first lead-out wheel **22** and the second lead-out wheel **24** are arranged opposite to each other in this embodiment, and the servo motor sheet-leading wheel **33** and the sheet-leading driven wheel **34** are arranged opposite to each other. The first lead-out wheel **22** and the servo motor sheet-leading wheel **33** are driving wheels that can be driven by the power source **60** (the servo motor sheet-leading wheel **33** in the picture has an integrated driving source). The second lead-out wheel **24** and the sheet-leading driven wheel **34** are not connected to the power source **60**, and can be driven to rotate by the advancing material **12**, the first lead-out wheel **22** and the servo motor sheet-leading wheel **33** respectively.

In addition, behind the worktable **31** of the processing unit **30** are a pneumatic cylinder **37**, a pressure wheel **38** connected to the pneumatic cylinder **37**, a sheet-leading driving wheel **39**, a power source **70**, and a collection tank **80**. The

sheet-leading driving wheel **39** and the pressure wheel **38** are set up in an opposite way to guide the cut and shaped window blind accessories to the collection tank **80**. The control unit **50** transmits instructions to the sheet-leading driving wheel 39 through the power source **70**.

5           The speed counting unit **40** is located in conveying unit **20**. In more detail, the speed counting unit **40** comprises a sensor **42**. The sensor **42** of the preferred embodiment is a rotary encoder as an example. The sensor **42** is set on the first lead-out wheel **22** in a coaxial arrangement. When the first lead-out wheel **22** is rotated by the motor, the coaxial sensor **42** can synchronously sense and record the rotation  
10   amount of the first lead-out wheel **22** (such as the rotation speed) and output a relative sensing signal.

          The control unit **50** comprises a controller **52**, and the controller **52** of the preferred embodiment is a PLC controller as an example. The controller **52** is electrically connected to the servo motor sheet-leading wheel **33**, the sheet-leading  
15   driving wheel **39** and the sensor **42**. On the one hand, it receives the sensing signal of sensor **42**, and on the other hand, according to the aforementioned sensing signal, further commands are transmitted to the servo motor sheet-leading wheel **33** and the sheet-leading driving wheel **39** to control the rotation amount of the servo motor sheet-leading wheel **33** and the sheet-leading driving wheel **39**.

20           In actual operation, use the first lead-out wheel **22** and the second lead-out wheel **24** set up and down to continuously push the material **12** to the processing unit **30**, as shown in FIG. 1. The first lead-out wheel **22**, which is driven and rotated by the power source **60**, will drive the second lead-out wheel **24** on the opposite side to rotate as the material **12** continues to advance, ensuring that the material **12** advances along  
25   the conveying path. At this time, the sensor **42** coaxially arranged with the first

lead-out wheel **22** will sense the rotation of the first lead-out wheel **22** and output the corresponding sensing signal to the controller **52**. Then the controller **52** analyzes and processes the above-mentioned sensing signal to obtain the rotation speed of the conveying unit **20** and the forward speed of the material **12**.

5           The controller **52** first controls the servo motor sheet-leading wheel **33** to rotate at the same speed as the conveying unit **20**. The sheet-leading driven wheel **34**, which is located on the opposite side of the servo motor sheet-leading wheel **33** and touches the surface of the material **12**, assists the servo motor sheet-leading wheel **33**, and advances the material **12** to the punching machine **35** for secondary punching. At  
10 this time, the pneumatic cylinder **37** drives the pressure wheel **38** to move down and touches the material **12**, and the sheet-leading driving wheel **39** presses up on the surface of the material **12** to ensure that the material **12** will not shake at the moment of punching and depart from the existing conveying path. Next, the servo motor sheet-leading wheel **33** and the sheet-leading driven wheel **34** continue to push the  
15 material **12** to the cutting machine **36** for cutting, and the cut material **12** forms a perforated accessory (in this embodiment, the slat).

          While the worktable **31** is punching and cutting the material **12**, the controller **52** will further control the sheet-leading driving wheel **39** so that it rotates at the same speed as the conveying unit **20** and the servo motor sheet-leading wheel **33**,  
20 and the sheet-leading driving wheel **39** and the pressure wheel **38** together guide the sheet-leading material **12** (that is, accessory) to the collection tank **80**. Then follow the above procedures for the next punching and cutting operation of the material **12**, so that the repeated operation can complete the processing of multiple accessories. It is added here that the accessories processed in this case are not limited to slats, and the  
25 material **12** of different materials can also be selected and the headrail or the bottom

rail can be processed according to the above procedures.

It can be seen from the above that the window blind accessory processing equipment **10** of the present invention can realize the effect of processing a material **12** into multiple accessories (such as headrails, bottom rails or slats) without braking or  
5 stopping the material **12**. There is no need to issue separate commands to the power sources **60,70** to adjust the rotation of the first lead-out wheel **22**, the servo motor sheet-leading wheel **33** and the sheet-leading driving wheel **39** to make them consistent. And the sensor **42**, which is coaxially set with the first lead-out wheel **22**, can more accurately sense the real-time transportation speed of the conveying unit **20** to improve  
10 production efficiency.

## WHAT IS CLAIMED IS:

1. A window blind accessory processing equipment, used to process a material into multiple accessories, the window blind accessory processing equipment comprising:

5           a conveying unit, said conveying unit comprising a first lead-out wheel and a second lead-out wheel that are set up and down relative to each other, said first lead-out wheel and said second lead-out wheel being used to continuously push said material forward;

          a processing unit, said processing unit comprising a worktable and a  
10 sheet-leading wheel set, said worktable comprising a cutting machine, said sheet-leading wheel set being located at a front side relative to said worktable and used to guide said material from said conveying unit to said worktable;

          a speed counting unit, said speed counting unit comprising a sensor, said sensor being coaxially arranged on said first lead-out wheel of said conveying unit to  
15 sense the rotation of said first lead-out wheel and output a corresponding sensing signal; and

          a control unit electrically connected to said speed counting unit, said control unit receiving said sensing signal of said sensor and obtaining the rotation amount of said first lead-out wheel according to said sensing signal, said control unit controlling  
20 said sheet-leading wheel set to rotate at the same speed to guide said sheet-leading material to enter said worktable at a consistent speed for cutting, so that the material that has been cut out forms an accessory.

2. The window blind accessory processing equipment as claimed in claim 1,  
25 wherein said first lead-out wheel of said conveying unit is a driving wheel, and said

second lead-out wheel is a driven wheel.

3. The window blind accessory processing equipment as claimed in claim 1,  
wherein said sheet-leading wheel set of said processing unit comprises a servo motor  
5 sheet-leading wheel and a sheet-leading driven wheel set up and down relative to each  
other; said control unit controls said servo motor sheet-leading wheel to rotate at the  
same speed as said first lead-out wheel.

4. The window blind accessory processing equipment as claimed in claim 1,  
10 wherein said sensor of said speed counting unit is an encoder.

5. The window blind accessory processing equipment as claimed in claim 1,  
wherein said worktable of said processing unit further comprises a punching machine  
located between said sheet-leading wheel set and said cutting machine.

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6. The window blind accessory processing equipment as claimed in claim 5,  
further comprising a collection tank located at a rear side relative to said processing  
unit and used to collect said accessories.

20 7. The window blind accessory processing equipment as claimed in claim 6,  
further comprising a pneumatic cylinder set between said processing unit and said  
collection tank, a pressure wheel connected to said pneumatic cylinder and a  
sheet-leading driving wheel set opposite to said pressure wheel, said sheet-leading  
driving wheel being electrically connected to said control unit, so that said  
25 sheet-leading driving wheel is controllable by said control unit to rotate at the same

speed as said first lead-out wheel to guide one said accessory to said collection tank at a consistent speed.

8. A window blind accessory processing method by using the window blind  
5 accessory processing equipment as claimed in any one of claims 1 to 7, the window blind accessory processing method comprising the steps of:

a) said first lead-out wheel and said second lead-out wheel continuing to push said material forward;

b) as said material continues to advance, said sensor sensing the rotation  
10 amount of said first lead-out wheel and outputting a corresponding sensing signal to said control unit; and

c) said control unit obtaining the rotation amount of said first lead-out wheel according to said sensing signal and controlling said sheet-leading wheel set to rotate at the same speed to transport said material to said processing unit to cut said material,  
15 so that the cut said material forms an accessory.

9. The window blind accessory processing method as claimed in claim 8, wherein when said material advances to said worktable for cutting and punching, said sheet-leading driving wheel pushes the accessory thus made forward, and said control  
20 unit controls said sheet-leading driving wheel to rotate at the same speed as said first lead-out wheel, and guides one said accessory to said collection tank together with said pressure wheel contacting said accessory.