

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 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, they will go through the process of punching and cutting in the middle before they are assembled with other parts (such as ladder tapes). For the foregoing process, the feeding mechanism first continuously advances the formed material. When it is advanced to the preset length, the control box will brake and stop the material, and at
15 the same time, the punching and cutting mechanism will be activated, so that the punching and cutting mechanism can punch and cut the material located below to obtain the finished slats, and then the feeding mechanism will be started again, so that the feeding mechanism can push the next piece of material. In this way, a cyclical operation is performed.

20 However, in the aforementioned process, the control box needs to start and close the feeding mechanism repeatedly. In addition to being easily damaged, the production efficiency will also be relatively poor. In addition, if the specifications of slat (such as length) are changed, the positions of punching and cutting must be adjusted accordingly, so at this time, it is necessary to replace another set of punching
25 and cutting mechanism according to the specifications of slat. In this way, it is

necessary to purchase multiple sets of punching and cutting mechanisms of different specifications, which causes an increase in the purchase cost, and the disassembly and replacement process will also be quite troublesome and inconvenient.

SUMMARY OF THE INVENTION

5 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 processing equipment, which can process a piece of material into multiple accessories without braking and stopping the material, so as to improve production efficiency.

 To achieve this and other objects of the present invention, a window blind
10 accessory processing equipment is used to process a material into multiple accessories. The window blind accessory processing equipment comprises a conveying unit, a linear transmission unit, a processing unit, a sensing unit, and a control unit. The conveying unit comprises two opposite leading wheels. The leading wheels are used to continuously push the material forward. The linear transmission unit is located at a
15 front side relative to the conveying unit, comprising a drive source and a mobile platform. The mobile platform is connected to the drive source so that the mobile platform is drivable by the drive source to linearly shift in the same direction as the forward direction of the material or in a direction opposite to the forward direction of the material. The processing unit comprises a cutting machine. The cutting machine is
20 set on the mobile platform so that the cutting machine is operable synchronously with the mobile platform. The sensing unit is located at a rear side relative to the conveying unit. The sensing unit comprises a rotating shaft and a sensor. The rotating shaft contacts the surface of the material to cause the rotating shaft to rotate when the material advances. The sensor is set on the rotating shaft to sense the amount of
25 rotation of the rotating shaft and output a corresponding sensing signal. The control

unit is electrically connected to the drive source, the cutting machine and the sensor. The control unit receives the sensing signal of the sensor and obtains the forward speed and forward distance of the material according to the sensing signal. When the material advances to meet a preset distance condition, the control unit controls the mobile
5 platform to advance at the same speed, and controls the cutting machine to cut the material, so that the cut material forms an accessory (such as headrail, bottom rail or slat).

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
10 multiple accessories without braking or stopping the material, so as to improve production efficiency. To adjust the accessory specifications, just adjust the parameter settings of the control unit so that the control unit controls the mobile platform to advance and controls the cutting machine to cut the material when the material advances different preset distances. In this way, there is no need to purchase additional
15 processing units of different specifications to save purchase costs.

Preferably, the processing unit further comprises a punching machine. The punching machine is located at a rear side relative to the cutting machine and is set on the mobile platform and is electrically connected to the control unit, so that the punching machine is controllable by the control unit to punch the material.

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

Preferably, the window blind accessory processing equipment further comprises an air cylinder set between the processing unit and the collection tank, and a
25 pressing wheel connecting to the air cylinder. The air cylinder is connected to the

control unit so that the air cylinder is controllable by the control unit to drive the pressing wheel to move down into contact with each accessory when each accessory passes under the pressing wheel so as to guide each accessory to the collection tank.

Preferably, the linear transmission unit further comprises a screw. The screw
5 is connected to the drive source and screwed to the mobile platform, so that the screw is driven by the drive source to drive the mobile platform to move back and forth along the axis of the screw.

Preferably, the linear transmission unit further comprises a worm gear connected to the drive source and a rack engaged with the worm gear. The mobile
10 platform is connected to the rack, so that the mobile platform is drivable by the rack to reset.

It is another object of the present invention to provide a processing method using the window blind accessory processing equipment mentioned above. First use the leading wheels to push the material forward continuously. Then, use the sensor to
15 sense the rotation of the rotating shaft and output a corresponding sensing signal to the control unit. The control unit obtains the forward speed and forward distance of the material according to the sensing signal. When the material advances to meet the preset distance condition, the control unit controls the mobile platform to advance at the same speed, and controls the cutting machine to cut the material, so that the cut material
20 forms an accessory.

Preferably, when said material advances to meet the preset distance condition, the control platform controls the punching machine to punch the material once, and then controls the mobile platform to advance. During the advancement of the mobile platform, the control unit controls the punching machine to punch the material for the
25 second time.

Preferably, after the cutting machine cuts out one accessory from the material, a guide wheel pushes the accessory forward, and the control unit controls an air cylinder to drive a pressing wheel to move down and contact the accessory for guiding the accessory to a collection tank.

5 The detailed structure, characteristics, assembly or use method of the window blind accessory processing equipment and processing method using the 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
10 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 invention and are not intended to limit the scope of the patent application of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

15 FIG. 1 is a schematic structural diagram of the window blind accessory processing equipment according to the first embodiment of the present invention.

FIG. 2 is a block diagram of the window blind accessory processing equipment according to the first embodiment of the present invention.

FIGS. 3A to 3C are flowcharts of the window blind accessory processing
20 method of the first embodiment of the present invention.

FIG. 4 is an oblique top elevational view of the accessory processed by the window blind accessory processing method of the first embodiment of the present invention.

FIG. 5 is a schematic structural diagram of the window blind accessory
25 processing equipment according to the second embodiment of 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 a first embodiment of the present invention comprises a conveying unit **20**, a linear transmission unit **30**, a processing unit **40**, a sensing unit **50**, and a control unit **60**.

The conveying unit **20** comprises two leading wheels **22** facing up and down. The two leading wheels **22** can be driven by a power source (such as a motor, not shown in the drawings) to rotate in opposite directions to continuously push a piece of
15 material **12** extruded through the plastic extrusion process.

The linear transmission unit **30** is located in front of the conveying unit **20**. The linear transmission unit **30** comprises a drive source **32** (here, a motor is taken as an example), a screw **34** and a mobile platform **36**. One end of the screw **34** is connected to the drive source **32**, so that the screw **34** can be driven by the drive source
20 **32** to rotate in place. The mobile platform **36** is screwed on the screw **34**, so that the mobile platform **36** can be driven by the screw **34** to move back and forth along the axis of the screw **34**.

The processing unit **40** comprises a cutting machine **42** for cutting the material **12** and a punching machine **44** for punching the material **12**. The cutting
25 machine **42** and the punching machine **44** are co-installed on the mobile platform **36** in

a tandem, so that the two can operate synchronously with the mobile platform **36**. Since the cutting machine **42** and the punching machine **44** are both conventional technologies and not the focus of the present invention, the detailed structure and operating principles are not repeated here.

5 The sensing unit **50** is located behind the conveying unit **20**. The sensing unit **50** comprises two rotating shafts **52** and a sensor **54** (a rotary encoder is taken as an example here). The two rotating shafts **52** are set up and down oppositely and contact the surface of the material **12** at the same time, so that the upper and lower rotating shafts **52** will be driven by the material **12** to rotate synchronously when the material
10 **12** advances. The sensor **54** is arranged on one of the rotating shafts **52** (the rotating shaft **52** arranged below in this embodiment, but not limited to this), and is used to sense the amount of rotation of the rotating shaft **52** and output a corresponding sensing signal.

 The control unit **60** is electrically connected to the drive source **32**, the
15 cutting machine **42**, the punching machine **44**, and the sensor **54**, on the one hand, receives the sensing signal of the sensor **54**, and on the other hand, further controls the drive source **32**, the cutting machine **42**, and the punching machine **44**'s startup and shutdown according to the aforementioned sensing signal.

 In actual operation, use the upper and lower two leading wheels **22** to
20 continuously push the material **12** forward, as shown in FIG. 3A. As the material **12** continues to advance forward, it will drive the upper and lower rotating shafts **52** to rotate synchronously. At this time, the sensor **54** senses the rotation of the rotating shafts **52** and outputs a corresponding sensing signal to the control unit **60**, and then the control unit **60** analyzes and processes the aforementioned sensing signal to obtain
25 the forward speed and forward distance of the material **12**. When the material **12**

advances to meet the preset distance condition, the control unit **60** first controls the punching machine **44** to punch the material **12** for the first time (the punched hole at this time is the punch **16**), and then controls the drive source **32** to start, as shown in FIG. 3B, thereby making the drive source **32** drive the mobile platform **36** through the screw **34** to move forward at the same speed. During the advancement of the mobile platform **36**, the control unit **60** will control the punching machine **44** to punch the material **12** for the second time (the punched hole is perforation **18**). Until the mobile platform **36** advances to the cutting position **P2** as shown in FIG. 3C, the control unit **60** controls the cutting machine **42** to cut the material **12**, and the cut material **12** forms an accessory **14** with two perforations **16**, **18** (in this example, the slat, as shown in FIG. 4). In addition, the material **12** is continuously pushed forward by a guide wheel **62** before being cut. Then when the control unit **60** controls the cutting machine **42** to cut the material **12**, the control unit **60** will further control an air cylinder **64** to drive a pressing wheel **66** to move down and contact the accessory **14** to ensure that the In the material **12** will not shake and leave the existing conveying path at the moment of punching and cutting, and guide the cut material **12** (that is, accessory **14**) to a collection tank **68**. As for the completion of material **12** cutting, the control unit **60** controls the drive source **32** to reverse, so that the drive source **32** drives the mobile platform **36** back through the screw **34** until the mobile platform **36** backs to the initial position **P1** as shown in FIG. 3A. Then, the material **12** is subjected to the next punching and cutting operation according to the above process, and the processing of multiple slats **14** can be completed by such a repeated operation.

It needs to be supplemented here that the linear transmission unit **30** is not limited to the use of the screw **34** drive, and different structural changes can also be adopted. In the second embodiment of the present invention, as shown in FIG. 5, the

linear transmission unit **30** comprises a worm gear **70** and a rack **72** that is engaged with the worm gear **70**, and the rack **72** is connected to the mobile platform **36**. In this way, when the worm gear **70** is driven by the drive source to rotate, the worm gear **70** will drive the rack **72** to move, and then the rack **72** will drive the mobile platform **36** to reset. In addition, the accessory **14** processed by the present invention is not limited to slat, and material **12** of different materials can also be selected and headrails or bottom rails 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 the material **12** into multiple accessories **14** (such as headrails, bottom rails or slats) without braking or stopping the material, so as to improve production efficiency. To match the specifications of different accessories **14**, just adjust the parameter settings of the control unit **60** to change the aforementioned preset distance conditions. For example, if the length of accessory **14** is shorter, and the preset distance that needs to be met when the material **12** is set to move forward is shorter. If the length of **14** is longer, the preset distance that needs to be met when the material **12** is set to move forward is longer. As for the relative position of the two perforations **16**, **18** can also be adjusted, so there is no need to purchase additional processing unit **40** of different specifications to save purchase costs.

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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 comprising two opposite leading wheels, said leading wheels being used to continuously push said material forward;

 a linear transmission unit located at a front side relative to said conveying unit, said linear transmission unit comprising a drive source and a mobile platform, said mobile platform being connected to said drive source so that said mobile platform
10 is drivable by said drive source to linearly shift in the same direction as the forward direction of said material or in a direction opposite to the forward direction of said material;

 a processing unit comprising a cutting machine, said cutting machine being set on said mobile platform so that said cutting machine is operable synchronously
15 with said mobile platform;

 a sensing unit located at a rear side relative to said conveying unit, said sensing unit comprising a rotating shaft and a sensor, said rotating shaft contacting the surface of said material to cause said rotating shaft to rotate when said material advances, said sensor being set on said rotating shaft to sense the amount of rotation of
20 said rotating shaft and output a corresponding sensing signal; and

 a control unit electrically connected to said drive source, said cutting machine and said sensor, said control unit receiving said sensing signal of said sensor and obtaining the forward speed and forward distance of said material according to said sensing signal, wherein when said material advances to meet a preset distance
25 condition, said control unit controls said mobile platform to advance at the same speed,

and controls said cutting machine to cut said material, so that the cut material forms an accessory.

2. The window blind accessory processing equipment as claimed in claim 1,
5 wherein said processing unit further comprises a punching machine, said punching machine being located at a rear side relative to said cutting machine and being set on said mobile platform and being electrically connected to said control unit, so that said punching machine is controllable by said control unit to punch said material.

10 3. The window blind accessory processing equipment as claimed in claim 2, further comprising a collection tank located at a front side relative to said processing unit and used to collect said accessories.

4. The window blind accessory processing equipment as claimed in claim 3,
15 further comprising an air cylinder set between said processing unit and said collection tank and a pressing wheel connecting to said air cylinder, said air cylinder being connected to said control unit so that said air cylinder is controllable by said control unit to drive said pressing wheel to move down into contact with each said accessory when each said accessory passes under said pressing wheel so as to guide each said
20 accessory to said collection tank.

5. The window blind accessory processing equipment as claimed in any one of claims 1-4, wherein said linear transmission unit further comprises a screw, said screw being connected to said drive source and screwed to said mobile platform, so
25 that said screw is driven by said drive source to drive said mobile platform to move

back and forth along the axis of said screw.

6. The window blind accessory processing equipment as claimed in any one of claims 1-4, wherein said linear transmission unit further comprises a worm gear
5 connected to said drive source and a rack engaged with said worm gear; said mobile platform is connected to said rack, so that said mobile platform is drivable by said rack to reset.

7. A processing method using the window blind accessory processing
10 equipment as claimed in claim 1, comprising the steps of:

a) said leading wheels continuing to push said material forward;
b) said sensor sensing the rotation of said rotating shaft and outputting a corresponding sensing signal to said control unit as said material continues to advance,
c) said control unit obtaining the forward speed and forward distance of said
15 material according to said sensing signal, wherein when said material advances to meet the preset distance condition, said control unit controls said mobile platform to advance at the same speed, and controls said cutting machine to cut said material, so that the cut material forms an accessory.

20 8. The processing method as claimed in claim 7, wherein when said material advances to meet the preset distance condition, said control platform controls said punching machine to punch said material once, and then controls said mobile platform to advance.

25 9. The processing method as claimed in claim 8, wherein during the

advancement of said mobile platform, said control unit controls said punching machine to punch said material for the second time.

10. The processing method as claimed in claim 9, wherein after said cutting
5 machine cuts out one accessory from said material, a guide wheel pushes the said accessory forward, and said control unit controls an air cylinder to drive a pressing wheel to move down and contact the said accessory for guiding the said accessory to a collection tank.