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(54) PROCESSING APPARATUS FOR ANTI-EXPLOSIVE MATERIAL AND THE CONTROL DEVICE THEREOF

(57) A processing apparatus for anti-explosive material and the control device thereof are disclosed. The processing apparatus for anti-explosive material includes a frame (1). A tray for the raw material roll (2), a guiding mechanism (3), a rolling cutter mechanism (4) and a webbing mechanism (5) are disposed from one end to the other end of the frame in order and spaced one from the other (1), and a cutting and material collecting mechanism (6) is fixed to the other end of the frame (1). A synchronous control unit (7) for the actuating motor (41) of the rolling cutter and the actuating motor (51) of the webbing mechanism is provided on the frame (1) and positioned between the rolling cutter mechanism (4) and the webbing mechanism (5). The synchronous control unit (7) is electrically connected to the adjusting control box and inputs the control signal to it, and the adjusting control box is electrically connected to the actuating motor (41) of the rolling cutter and the actuating motor (51) of the webbing mechanism and outputs the control signal to regulate the speed. The apparatus of the present invention has a simple structure and low cost. Since operation of the actuating motor (41) of the rolling cutter and the actuating motor (51) is synchronous, the degree of the automated control of the apparatus is increased, the control of the manufacturing process of the anti-explosive material is enhanced, the processing period is short and the work efficiency is high. The decontaminating means for the rolling cutter (42) is improved to ensure the rolling cutter (42) remains clean and sharp during the manufacturing process of the anti-explosive material, thus enhancing product quality. An automatic cutting and material pushing mechanism is also provided, to enable accurate roll quantity control, lower labor intensity and safe and reliable operation.

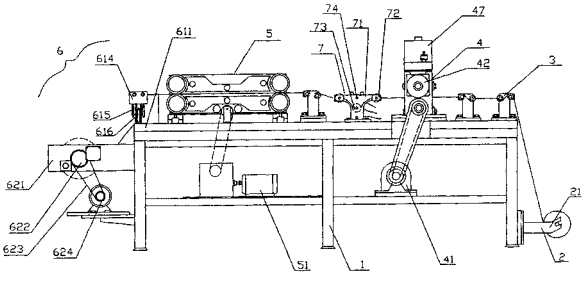

Fig 1

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Description

Field of the Invention

[0001] The present invention relates to a processing equipment for explosion-proof material and its control device, in particular to a processing equipment for explosion-proof filling material installed in storage/transport vessel of combustible and explosive chemicals and a rolling-cutting and mesh-pulling synchronization control unit thereof.

Description of the Prior art

[0002] It is necessary to install explosion-proof filling materials in the storage-transport vessels for combustible and explosive liquid and/or gaseous chemicals, so as to prevent the medium stored in such vessels from combustion or explosion triggered by unexpected accidents such as static electricity, naked flame and gunshot etc. The manufacturing procedures for such explosion-proof material are described as follows: cutting the aluminum alloy foil material into a grid, gradually stretching both sides of such material outward to form a high porosity lamellar material; with a end of such high porosity lamellar material as center rolling it along the direction perpendicular to this end to get a multilayer cylindrical explosion-proof material body. The conventional processing equipment has been related in the Description of invention patent ZL02117070.3. The rolled up aluminum alloy foil material used in the conventional equipment is set on the material roll bracket at the upper part of a chassis. The material roll adopted for such equipment weights about 50 kilogram, which is a big load and leads to certain difficulty in manual installation and disassembly of the material roll. For conventional equipment, nonsynchronization of the rotation speeds of the rolling cutter drive motor of the cutting mechanism and the rotation speed of the mesh-pulling stretching drive motor of the mesh-pulling mechanism often occurs in the process of operating. While processing the explosion-proof material, the motor speed often changes making it necessary to regulate the motor frequently, which seriously restrain the production progress and the quality of finished products. During continuous cutting process of the conventional equipment, dust and material particles on the surface of aluminum foil are liable to block the cutting blade and blunt the blade, which in turn affects the cutting quality. In addition, the conventional equipment is provided with a manual cutter for cutting mesh material, so that it is difficult to control the roll size of finished material roll. Furthermore, after cutting the material roll, it is required to take out the material manually, which is inefficient and requires intense physical labor, and it even jeopardizes the potential safety of the operator.

[0003] To sum up, the conventional equipment has many defects such as low automation control level, low working efficiency, inferior product quality, high labor intensity and big potential safety hazard. Thus it needs to be improved.

Summary of the Invention

[0004] Aiming at overcoming the deficiencies of prior art, the first objective of the present invention is to provide a simple-structured low-cost processing equipment for explosion-proof material, which provides synchronized operation of the drive motors of the rolling cutter and the mesh-pulling device so as to improve the automation level of the equipment and strengthen the control over the production process of explosion-proof material. With such a processing equipment, processing cycle is shortened and working efficiency is improved.

[0005] The second object of the present invention is to provide a processing equipment of explosion-proof material comprising an optimized dirt and particle removal means for the rolling cutter so as to guarantee the cleanness and sharpness of the rolling cutter in manufacturing procedures of explosion-proof material; With such a processing equipment, the quality of finished products is improved.

[0006] The third object of the present invention is to provide a processing equipment of explosion-proof material comprising a pneumatic cutter and a pusher mechanism so as to achieve accurate control of the measure of the material roll, reduce labor intensity and achieve safe and reliable operation.

said the above objectives of the present invention are achieved through the technical solutions described as follows.

[0007] The processing equipment for explosion-proof material provided by the present invention comprises a chassis, wherein, from one end to the other end of such chassis, a raw material roll bracket, a guide mechanism, a rolling-cutter mechanism and a mesh-pulling mechanism are respectively fixed in sequence and at intervals. A cutting and material-receiving mechanism is fixed on the other end of the chassis. To ensure the mesh-pulling quality of the explosion-proof material, a synchronization control unit for the rolling-cutter drive motor and the mesh-pulling stretching drive motor is set on between the rolling-cutting mechanism and the mesh-pulling mechanism on said chassis. This synchronization control unit is electrically connected with the regulating control box and inputs control signal to it. The regulating control box is electrically connected with the rolling-cutter drive motor and the mesh-pulling stretching drive motor and outputs control signals to regulate their rotation speeds so as to make them operate in a synchronized manner.

[0008] Said synchronization control unit comprises a buffering roller frame fixed on the chassis. This buffering roller frame is composed of a pair of "T"-shaped vertical frames fixed on both sides of the chassis facing each other. Across the chassis on top of both ends of the cross beam of the " T"-shaped vertical frame are installed with a roller shaft, upon which is mounted a buffering roller.

A locating slot is set on the inside surface of the upright column of the T"-shaped vertical frame and a buffering rod is set in the locating slot slipping up and down. A sensor is set on the upright column of the "T"-shaped vertical frames to detect the position of the buffering rod. The output end of the sensor is connected with the input end of the regulating control box. A plurality of such sensors is set on more than one positions of the upright column of "T"-shaped vertical frame. To achieve more accurate detection result, said sensors are respectively set on the upper, middle and lower positions on the outside surface of the upright columns of "T"-shaped vertical frames.

[0009] To guarantee the cleanness and smoothness of the rolling cutter blade, a brush is set on the upper part of the rolling-cutter roller bracket of said rolling-cutting mechanism. An oil dripping cup is set above of the brush, with the oil dripping hole of the oil dripping cup extending to the brush handle. An oil storage tank is set inside the handle of the brush with a plurality of oil dripping holes provided in lower part of the oil storage tank and connected with the brush. A control valve is set in the oil dripping cup comprising a valve core connected with a rotation handle, which is set above the oil dripping cup and extends out of oil dripping cup. The end of the valve core is corresponding to the outlet position of the oil-dripping hole. The space between the end of the core and oil-dripping hole outlet can be regulated by turning the rotation handle, so that the oil output amount flowing from the oil dripping cup into the brush handle is changed accordingly.

[0010] Meanwhile, a dust hood is set over the rolling-cutter blade of said rolling-cutting mechanism. The hood is connected with an external vacuum dust collector, which is used to absorb the dust and material particles on the surface of the aluminum foil.

[0011] Said cutting and material-receiving mechanism comprises a platform fixed on the horizontal plane at the top end of the chassis. A pneumatic sliding sleeve and a sliding guide track are mounted on both ends of the platform brackets. The pneumatic sliding sleeve is interconnected with a slipper, a supporting rod is set under the slipper; a disk-shaped cutter is mounted on the supporting rod. The pneumatic sliding sleeve is interconnected with high-pressure gas source and a sliding part is set in the slipper. Under the action of high pressure, the sliding part can make the slipper reciprocate along the sliding guide sleeve and the guiding track. The slipper drives the disc-shaped cutter to roll and cut off the finished product of mesh material.

[0012] A supporting plate is mounted under the platform outside of the end of said chassis, on which a material-receiving reel is threaded. This material-receiving reel is connected with the output shaft of rolling-up motor on the chassis through a chain. The mesh material that is formed by pulling is wound on the material-receiving reel to form a multilayer cylindrical body.

[0013] A pneumatic pusher mechanism is set on the material-receiving reel, and it comprises a pneumatic sliding sleeve and a sliding guide track, both fixed under the platform. The pneumatic sliding sleeve is interconnected with the slipper, which connected with a pushing plate fitted on the material receiving reel. The pneumatic sliding sleeve is interconnected with a high pressure gas source. A sliding part is set inside the slipper. Under the action of high pressure, this sliding part can make the slipper move along the sliding guide track, and the slipper driving the pushing plate to push the multilayer cylindrical explosion-proof material body off the material-receiving reel.

[0014] A pneumatic pusher mechanism is set on the material receiving reel, it may further comprises a baffle set on one end of the chassis. A cylinder is fixed on the baffle. A telescopic push rod in the cylinder passes through the baffle and is connected with an annular plate. The annular plate is fitted above the material-receiving reel and does not contact with the reel shaft. The annular plate is connected with a guide bar that passes through the baffle. The cylinder is provided with a high-pressure inlet pipe and outlet pipe which are connected with a gas source through a high pressure-resistant hose. The high-pressure gas in the cylinder makes the push rod move telescopically and drives the annular plate to move on the material-receiving reel along the guide bar, so as to push the multilayer cylindrical explosion-proof material off the material-receiving reel.

[0015] Said high-pressure gas has a pressure of 7.5 KPa and the gas flow rate is 0.22 M^3 / minute.

[0016] To facilitate loading and unloading of the raw material roll, said raw material roll bracket is fixed on the lower position outside of the chassis.

[0017] The fourth object of the present invention is to provide a control unit for rolling-cut and mesh-pulling synchronization of a processing equipment of explosion-proof material, aiming at overcoming the deficiency of prior art. Such rolling-cut and mesh-pulling synchronization control unit is simple in structure and low in cost. Since the control unit achieves synchronized operation of the rolling-cutter drive motor and the mesh-pulling stretching drive motor, the quality of explosion-proof material is improved greatly.

[0018] This objective of the present invention is achieved through the technical solutions described as follows.

[0019] The present invention provides a control device for a processing equipment of explosion-proof material, said control device comprises a rolling-cut and mesh-pulling synchronization control unit. Said control unit is set on the chassis of the processing equipment of explosion-proof material and positioned between the rolling-cutting mechanism and the mesh-pulling mechanism. The control unit comprises a buffering roller frame fixed on the chassis. This buffer roller frame is composed of a pair of "T"-shaped vertical frames that are correspondingly fixed on both sides of chassis facing each other. Across the corresponding ends on both sides of the cross

beam of the " T"-shaped vertical frame are installed a roller shaft upon which is mounted a buffering roller. A locating slot is set on the inside surface of an upright column of a "T"-shaped vertical frame. A buffering rod is set in this locating slot slipping up and down. A sensor is set on the upright column of the "T"-shaped vertical frame to detect the position of the buffering rod. The output end of the sensor is connected with the input end of regulating control box. A plurality of said sensors is set on more than one position of the upright columns of "T"-shaped vertical frames. This synchronization control unit is electrically connected with the regulating control box and inputs control signals to it. The regulating control box is electrically connected with the rolling-cutter drive motor and the mesh-pulling stretching drive motor and outputs control signals to regulate their rotation speeds and make them synchronized operation. These sensors are set on the upper, middle and lower positions on the outside surface of the upright columns of "T"-shaped vertical frames.

[0020] To sum up, the present invention provides a processing equipment of explosion-proof material and its control device, which is simple in structure and low in cost. Since the unit achieves the synchronized operation of the rolling cutter drive motor and the mesh-pulling stretching drive motor, it improves the automation control of equipment, strengthens the control over the production process of explosion-proof material, shortens the processing cycle and improves the working efficiency. It also optimizes the dirt and particle removal means for rolling cutter and guarantees the cleanness and sharpness of rolling cutter in the manufacturing procedures of explosion-proof material, and thus improves the quality of the finished products. Providing a pneumatic cutting and pusher mechanism, such processing equipment achieves accurate control of measure of the material roll, reduces labor intensity and achieves safe and reliable operation.

[0021] The technical proposal of the present invention is elaborated below in combination with the attached figures and the embodiments.

Brief Description of the Drawings

[0022]

Figure 1 is the overall structural scheme of embodiment 1 of present invention;

Figure 2 is the local structural scheme of the synchronization control unit of embodiment 1 of present invention ;

Figure 3 is the local structural scheme of the brush and oil dripping cup of embodiment 1 of present invention;

Figure 4 is the local structural scheme of the oil dripping cup of embodiment 1 of present invention;

Figure 5 is the overall planform view of the equipment in embodiment 1 of present invention;

Figures 6, 7 and 8 are local structural schemes of the pneumatic pusher mechanism observed from three different views of embodiment 1 of present invention.

Figure 9 is the local structural scheme of the pneumatic pusher mechanism of embodiment 2 of present invention.

Detailed Description of the Preferred Embodiments

Embodiment 1

[0023] Figure 1 is the overall structural scheme of embodiment 1 of present invention. As shown in Figure 1, the present invention provides a processing equipment of explosion-proof material comprising a chassis 1, wherein, from one end to the other end of the chassis 1, a raw material roll bracket 2, a guide mechanism 3, a rolling-cutting mechanism 4 and a mesh-pulling mechanism 5 are respectively fixed in sequence and at intervals. A cutting and material-receiving mechanism 6 is fixed on the other end of the chassis 1. This equipment is mainly designed for the following manufacturing procedures for explosion-proof material: cutting the aluminum alloy foil material into grid shape by means of rolling-cutter mechanism 4, then, in the mesh-pulling mechanism, gradually stretching both sides of such material outward to form a high porosity lamellar material; with a end of such high porosity lamellar material as center, rolling it along the direction being perpendicular to this end to get a multilayer cylindrical explosion-proof material body.

[0024] With respect to the rolling-cutting mechanism of conventional equipment, since nonsynchronization of the rotation speed of rolling cutter drive motor 41 and he rotation speed of the mesh-pulling stretching drive motor 51 of the mesh-pulling mechanism often occurs in the process of operation, it is necessary to perform debugging after the equipment has operated for a short time. Especially in the manufacturing procedure, the motor speed changes frequently, so that it is necessary to make adjustment continually, which seriously confines the production progress and the quality of finished products. Therefore, as shown in Figure 1, in the present invention, a synchronization control unit 7 for the rolling-cutter drive motor and meshing-pulling device drive motor is set on the chassis between rolling cut mechanism 4 and the mesh-pulling mechanism 5. This synchronization control unit 7 is electrically connected with the regulating control box (not shown in the Figure) and inputs control signal to the regulating control box. The regulating control box is electrically connected with the rolling-cutter drive motor 41 and mesh-pulling stretching drive motor 51 and inputs control signals to regulate their rotation speeds so as to achieve synchronized operation of them.

[0025] Figure 2 is the local structural scheme of the synchronization control unit of embodiment 1 of present invention. As shown in Figure 2, the synchronization control unit 7 comprises a buffer roller frame 71 fixed on the chassis. This buffer roller frame 71 is composed of a pair

of "T"-shaped vertical frames 711 and 712, between the corresponding top ends on each of them is installed a roller shaft (not shown in the Figure), on which is mounted a buffer sleeve 72. A locating slot 73 is set on the inner side of the upright column of the "T"-shaped vertical frame. A buffer rod 74 is set in this locating slot 73 and can slide up and down in this locating slot 73. A sensor 75 is set on the upright column of "T"-shaped vertical frames to detect the position of the buffering rod and can be installed on the outside surface of the upright column of "T" shaped vertical frame, the output end of sensors 75 being electrically connected with the input end of regulating control box. To achieve more accurate detection, a plurality of sensors 75 are respectively set on the upper, middle and lower positions of the upright column of "T"-shaped vertical frame. In general, XTFJ - R12 sensors can be adopted. When the equipment is in operation of processing the explosion-proof material, the buffering rod 74 is attached onto the upper surface of the processed material. In case of nonsynchronization of the rotation speeds of the rolling-cutter drive motor 41 and the mesh-pulling stretching drive motor 51, the stretching force applied on the materials on the buffer roller frame 71 varies, and the tension of the material varies accordingly. The buffer rod 74 attached onto the material slide up and down in the locating slot 73. When the buffering rod 74 is on the upper position of the buffer roller frame 71, the buffering rod 74 blocks the sensors 75 on the upper position of the buffer roller frame 71; When the buffer rod is on the lower position of the buffer roller frame 71, the buffer rod 74 blocks the sensors on the lower position of the buffer roller frame 71. The blocked sensors will output the sensing signals to the regulating control box, and the regulating control box will output the control signals, and by means of PLC regulating control system in the regulating control box, the rotation speeds of the rolling-cutter drive motor 41 and the mesh-pulling stretching drive motor 51 can be regulated, and so the synchronization can be achievable. By this time, the equipment should be in the optimum operation condition, and the buffer rod 74 should be located on the middle position. Since the synchronization control unit 7 achieves the synchronized operation of the drive motors, reliability of the equipment operation is greatly enhanced and the product quality is also improved.

[0026] As shown in Figure 1, the rolling cutter 42 in the rolling-cutting mechanism 4 is composed of a pair of slits-cutting rollers (namely upper and lower rollers). The upper roller is composed of multiple disk cutters, on each of which there is a blade and a groove. The lower roller is designed with corresponding discs. During the continuous cutting, the dust and material particles on the surface of aluminum foil are liable to block the cutter blade, so that the blades become blunt and the cutting quality is seriously affected. Figure 3 is the local structural scheme of the brush and oil dripping cup of embodiment 1 of present invention. As shown in Figure 3 in combination with Figure 1, to keep the cleanness and sharpness of rolling-cutter 42, a brush 43 is set at the upper portion of rolling-cutter roller bracket of the rolling-cutting mechanism 4 and can be used for removing dust and particles. To maintain the sharpness of blade, an oil dripping cup 44 is set above brush 43, with the oil-dripping hole of the oil dripping cup extending to the brush handle 45. An oil storage tank 46 is set inside the brush handle 45. A plurality of oil-dripping holes (not shown in the Figure) is set in the lower part of the oil storage tank 46 and connected with the brush. Along with the movement of brush 43, the cleansing oil in oil-dripping cup 44 provides dripping lubrication for the cutter through oil-dripping holes. In this way, the brush can conveniently remove the dust and material particles deposited on rolling cutter and keep the slits grid to be cut even and consistent.

[0027] Figure 4 is the local structural scheme of the synchronization control unit of embodiment 1 of present invention. As shown in Figure 4, a control valve is set in the oil dripping cup 44 for regulating or controlling the oil amount. This control valve comprises a valve core 442 connected with a rotation handle 441, the rotation handle 441 being set above the oil dripping cup 44 and extends out of the oil dripping cup 44. The end of valve core 442 is set corresponding to the position of oil-dripping hole outlet 443; The clearance between the end of core valve 442 and the oil-dripping hole outlet 443 can be regulated by turning the rotation handle 441, so that the oil output amount flowing from the oil dripping cup 44 into the brush handle is changed.

[0028] Meanwhile, as shown in Figures 1 and 3, to effectively remove the material particles generated by the rolling-cutting mechanism in the manufacturing procedure, a dust hood 47 is also set over the rolling-cutter 42 of the rolling-cutting mechanism 4, and this dust hood is connected with the external vacuum dust collector. During the processing of the raw aluminum alloy foil material, this dust hood 47 connected with the vacuum can effectively prevent the aluminum powder on aluminum foil from flying about and remove them so as to keep the working environment clean.

[0029] Figure 5 is the overall planform of the equipment of embodiment 1 of present invention. As shown in Figure 5 in combination with Figure 1, in the processing equipment provided in the present invention, the cutting and material-receiving mechanism 6 comprises a platform 611 fixed on the horizontal plane at the top of the chassis 1. A pneumatic sliding sleeve 613 and a sliding guide track 617 are mounted on the brackets 612 on both ends of the platform, wherein the pneumatic sliding sleeve is interconnected with the slipper 614, under which a supporting rod 615 is set; and a disk-shaped cutter 616 is mounted on the supporting rod 615. The pneumatic sliding sleeve and the sliding track are connected to a high-pressure gas source. A sliding part (not shown in the Figure) is set in the slipper 614. Under the action of high-pressure gas stream, the sliding part enables the slipper 614 to reciprocate along the sliding guide sleeve and sliding track. The slipper 614 drives the disc-shaped cut-

ter 616 to roll on and cut off the finished product of mesh material. In general, the high-pressure gas filled in the pneumatic sliding sleeve has pressure of 7.5 KPa and gas flow rate of 0.22 M^3 / minute. The pipe joint is a barbed joint with diameter of 8mm.

[0030] The operation mode of the conventional equipment is as follows: After manual cutting, the material should be manually taken out from the shaft of rolling mechanism. This operation mode involves high labor intensity and potential safety hazard. Figures 6, 7 and 8 are local structural schemes of the pneumatic pusher mechanism of embodiment lof present invention observed from three different views of. As shown in Figures 6-8 in combination with Figures 1 and 5, a supporting plate 621 is mounted under the platform outside of the end of chassis 1, a material-receiving reel 622 is threaded on the supporting plate 621. This material-receiving reel 622 is connected with the output shaft of rolling-up motor 624 on chassis 1 through a chain 623. The formed reticular material is wound on the material-receiving reel 622, and thus the multilayer cylindrical material body is obtained. A pneumatic material pusher mechanism 63 is set on said material-receiving reel 622, and it comprises a pneumatic sliding sleeve 631 and a sliding guide track 632 that are fixed under the platform 611. The pneumatic sliding sleeve 631 is interconnected with the slipper 633, the slipper 633 is connected with a pushing plate 634 fitted on the material receiving reel 622. A groove which is larger than the material-receiving reel 622 is fit on the front end of pushing plate 634 without contact with the shaft. The pneumatic sliding sleeve 631 is connected with the high-pressure gas source, and a sliding part (not shown in the Figure) is set inside the slipper 633. Under the action of high-pressure gas stream, this sliding part enables the slipper 633 to move along the sliding guide track 632, and the slipper 633 drives the pushing plate 634 to push the multilayer cylindrical explosion-proof material off the material-receiving reel 622. The high-pressure gas has pressure of 7.5 KPa and gas flow of 0.22 M^3 / minute.

[0031] In the manufacturing procedures for explosion-proof material, the control on the pneumatic cutting, rolling and automatic material-pushing is performed according to the pre-setting of the counter installed on the shaft of slits-cutting roller. When the motor rotates for a circle, the counter records a pulse count. After the counts add up to the preset value, for example, 100 impulses, a roll of material is formed. After the material-receiving reel 622 has wound up a required roll of finished product, the regulating control box sends an instruction such as to stop the running of rolling-cutter drive motor 41 and the mesh-pulling stretching drive motor 51. Then, the relay starts the gas source for gas supplying, which drives the disc cutter of the rolling-cutting mechanism to cut off the roll of reticular explosion-proof material. Finally the pneumatic material pusher mechanism is activated, and it pushes off the explosion-proof material wound around the material-receiving reel, thus completing the processing of a roll of finished product material.

[0032] In addition, the roll of raw aluminum alloy material in the conventional equipment is set on the roll bracket at the upper part of the chassis, with the weight of a roll of raw foil material being about 20 kg. The rolled material of raw aluminum alloy foil material used at present has weight about 50kg, so that the working strength is very high in case of transporting or lifting the rolled material. Therefore, as shown in Figure 1 in combination with Figure 5, the roll bracket is set at the bottom of the chassis in the present invention, to be specific, the raw material roll bracket 2 is fixed under the outside of one end of chassis 1, so as to facilitate the loading and unloading of raw material roll. This raw material roll bracket 2 extends two long arms 21 outward, and bearing sleeves being set on the arm ends. The aluminum foil material with reel is placed on the forked standard of bearing. A friction assembly is installed on one side of forked standard of bearing, with the structure of this friction assembly being designed as identical to that of shaft brake assembly of bicycle, so that the unrolling procedure of rolled material is limited evenly and has certain damping. Through said improvements, the processing equipment of explosion-proof material provided by the present invention may reduce labor intensity and enhance working efficiency.

Embodiment 2

[0033] Figure 9 is the local structural scheme of the pneumatic pusher mechanism of embodiment 2 of present invention. As shown in Figure 9, the structure of the pneumatic pusher mechanism set on the material receiving reel in this embodiment is different from embodiment 1 in some aspects. This pneumatic pusher mechanism 64 comprises a baffle 641 set on one end of the chassis. A cylinder 642 is fixed on the baffle 641, and a telescopic push rod 643 is set in the cylinder 642 passing through the baffle and connecting with a annular plate 644. This annular plate 644 is fitted above the material-receiving reel 622 and does not contact with the reel. The annular plate 644 is also connected with a guide bar 645 that passes through the baffle 641. The inlet pipe and outlet pipe of high-pressure gas are attached onto the cylinder 642 and are connected with gas source through high pressure-resistant hose. The high-pressure gas in the cylinder enables the telescopic push rod 643 move telescopically and drives the annular plate 644 to move on the material-receiving reel 622 along the guide bar 645, so as to push the multilayer cylindrical explosion-proof material body off the material-receiving reel, thus completing the material processing.

[0034] The other technical characteristics of this embodiment are the same as those of embodiment 1. For the detailed content, refer to embodiment 1, and unnecessary details will no longer be provided herein.

[0035] Finally it must be mentioned as follows: said the above embodiments are merely used to describe rather

than limit the present invention. Although detailed description of the present invention is provided with reference to preferred embodiments, it shall be understand for the common technologists in this field that all the modifications or equivalent substitutions to the present invention without deviation from the spirit and scope of the present invention shall be covered by the Claims of present invention.

Claims

1. A processing equipment for explosion-proof material, comprising a chassis, a raw material roll bracket, a guide mechanism, a rolling-cutting mechanism and a mesh-pulling mechanism that are respectively fixed in order and at intervals from one end to the other end of the chassis, with a cutting and material-receiving mechanism fixed on the other end of the chassis, **characterized in that:**

   A synchronization control unit for the rolling-cutter drive motor and the mesh-pulling stretching drive motor is set between the rolling-cutting and the mesh-pulling mechanism on said chassis;
   Said synchronization control unit is electrically connected with the regulating control box inputting control signal to the regulating control box,
   The regulating control box is electrically connected with the rolling-cutter drive motor and mesh-pulling stretching drive motor inputting control signals to regulate their rotation speed so as to achieve synchronized operation of them.

2. A processing equipment for explosion-proof material of Claim 1, **characterized in that** said synchronization control unit comprises a buffer roller frame fixed on the chassis and said buffer roller frame is composed of a pair of "T"-shaped vertical frames being fixed on both sides of the chassis facing each other; wherein
   across the corresponding top ends on both sides of the cross beam of the " T"-shaped vertical frame being installed a roller shaft upon which a buffer roller is mounted;
   a locating slot being set on the inside surface of the upright column of the "T"-shaped vertical frame, a buffer rod being set in this locating slot for slipping up and down,
   a plurality of sensors being set on the upright columns of "T"-shaped vertical frames to detect the position of buffer rod, with the output end of the sensor being connected with the input end of the regulating control box,;
   said plurality of sensors being set on a plurality of positions on the upright column of "T"-shaped vertical frame.

3. A processing equipment for explosion-proof material of Claim 2, **characterized in that** said sensors are respectively set on the upper, middle and lower positions on the outside surface of the upright columns of "T"-shaped vertical frames.

4. A processing equipment for explosion-proof material of Claim 1, **characterized in that** a brush is set on the upper part of the rolling-cutter roller bracket of said rolling-cutting mechanism, wherein an oil dripping cup being set above the brush and an oil storage tank being set inside the handle of the brush; a plurality of oil dripping holes being set in the lower part of the oil storage pool and extending to the brush handle connected with the brush.

5. A processing equipment for explosion-proof material of Claim 4, **characterized in that** a control valve comprising a valve core connected with a rotation handle is set in said oil dripping cup, wherein said rotation handle being set above the oil dripping cup and extending out of the oil dripping cup; the end of the valve core being set corresponding to the position of the oil-dripping hole outlet, the clearance between the end of the valve core and the oil-dripping hole outlet being regulated by turning the rotation handle to change, so that the oil output amount flowing from the oil dripping cup into the brush handle is changed.

6. A processing equipment for explosion-proof material of Claim 1, **characterized in that** a dust hood is set over the rolling-cutter of said rolling-cutting mechanism and is connected with an external vacuum dust collector removing the dust and material particles on the surface of aluminum foil.

7. A processing equipment for explosion-proof material of Claim 1, **characterized in that** said cutting and material-receiving mechanism comprises a platform fixed on the horizontal plane at the top of the chassis, a pneumatic sliding sleeve and a sliding guide track being mounted onto both ends of the platform brackets, wherein the pneumatic sliding sleeve being interconnected with the slipper, a supporting rod being set under the slipper and a disk-shaped cutter being mounted on the supporting rod;
   said pneumatic sliding sleeve also being interconnected with a high pressure gas source; with the action of high pressure draft, the sliding part set inside the slipper making the slipper reciprocate along the sliding guide track, the slipper driving the disc-shaped cutter roll on and cut off the finished product of mesh material.

8. A processing equipment for explosion-proof material of Claim 7, **characterized in that** a supporting plate is mounted under the platform outside of the end of

said chassis, a material-receiving reel being threaded on the supporting plate and connected with the output shaft of the rolling-up motor on the chassis through a chain, the formed reticular material being wound on the material-receiving reel to form a multilayer cylindrical material body.

9. The processing equipment for explosion-proof material of Claim 8, **characterized in that** said material-receiving reel is provided with a pneumatic pusher mechanism comprising a pneumatic sliding sleeve and a sliding guide track fixed under the platform, wherein the pneumatic sliding sleeve being interconnected with the slipper, the slipper being connected with a pushing plate fitted on the material receiving reel; the pneumatic sliding sleeve being interconnected with the high pressure gas source, and a sliding part being set inside the slipper; under the action of high pressure, the sliding part making the slipper move along the sliding guide track, and the slipper driving the pushing plate to push the multilayer cylindrical explosion-proof material off the material-receiving reel.

10. The processing equipment for explosion-proof material of Claim 8, **characterized in that** said material-receiving reel is provided with a pneumatic pusher mechanism comprising a baffle set on one end of the chassis, wherein a cylinder being fixed on the baffle, and the telescopic push rod in the cylinder passing through the baffle and being connected with a annular plate, the annular plate being fitted above the material-receiving reel and disconnected with the reel, the annular plate also being connected with a guide bar that passes through the baffle, the inlet pipe and outlet pipe of high-pressure gas on the cylinder being connected with gas source through high pressure-resistant hose, the high-pressure gas in the cylinder making the push rod move telescopically and driving the annular plate move on the material-receiving reel along the guide bar so as to push the multilayer cylindrical explosion-proof material body off the material-receiving reel.

11. The processing equipment for explosion-proof material of Claim 7 or 9 or 10, **characterized in that** the pressure of said high-pressure gas is 7.5 KPa.

12. The processing equipment for explosion-proof material of Claim 7 or 9 or 10, **characterized in that** the flow rate of said high-pressure gas is 0.22 M^3 / minute.

13. The processing equipment for explosion-proof material of Claim 1, **characterized in that** said raw material roll bracket is fixed under the platform outside of one end of the chassis, so as to facilitate the loading and unloading of raw material roll.

14. A control device for the processing equipment for explosion-proof material, comprising a rolling-cut and mesh-pulling stretching synchronization control unit, **characterized in that** said synchronization control unit is set on the chassis of the processing equipment for explosion-proof material, and is positioned between the rolling-cutting mechanism and the mesh-pulling mechanism, the synchronization control unit comprising a buffer roller frame fixed on the chassis, wherein the buffer roller frame being composed of a pair of "T"-shaped vertical frames that are correspondingly fixed on both sides of the chassis facing each other, across the corresponding ends on both sides of the cross beam of the " T"-shaped vertical frame being installed a roller shaft upon which is mounted a buffer roller; a locating slot being set on the inside surface of upright column of "T"-shaped vertical frame, a buffer rod being set in this locating slot for slipping up and down; some sensors being set on the upright column of "T"-shaped vertical frame to detect the position of buffer rod, the output end of the sensor being connected with the input end of regulating control box, a plurality of said sensors being set on a plurality of positions on the upright columns of "T"-shaped vertical frames; the synchronization control unit being electrically connected with the regulating control box and inputting a control signal to the regulating control box, the regulating control box being electrically connected with the rolling-cutter drive motor and the mesh-pulling stretching drive motor and outputting a control signal to regulate their rotation speeds to achieve synchronized operation.

15. The control device for processing equipment for explosion-proof material of Claim 14, **characterized in that** said sensors are respectively set on the upper, middle and lower positions on the outside surface of the upright columns of " T"-shaped vertical frames.

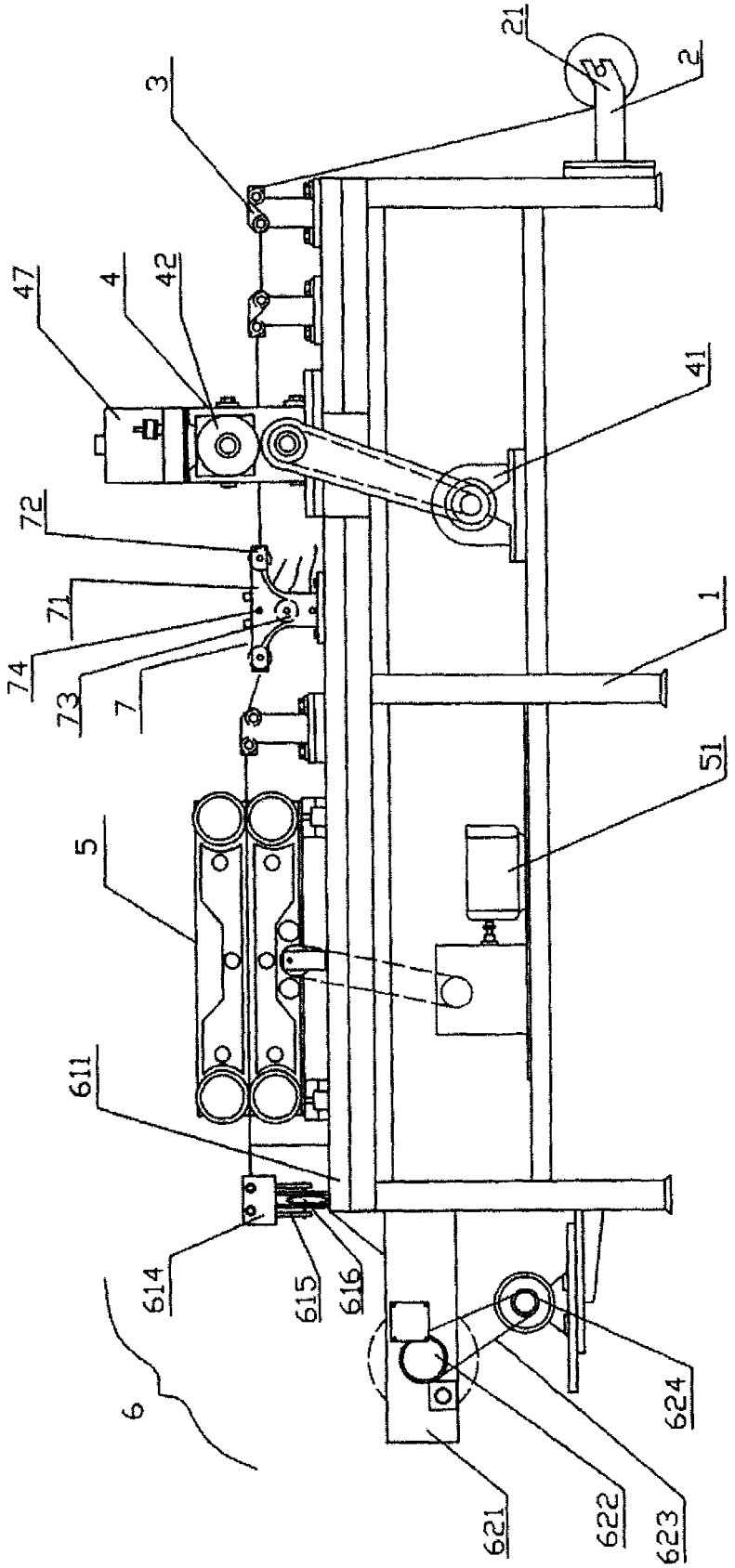

Fig 1

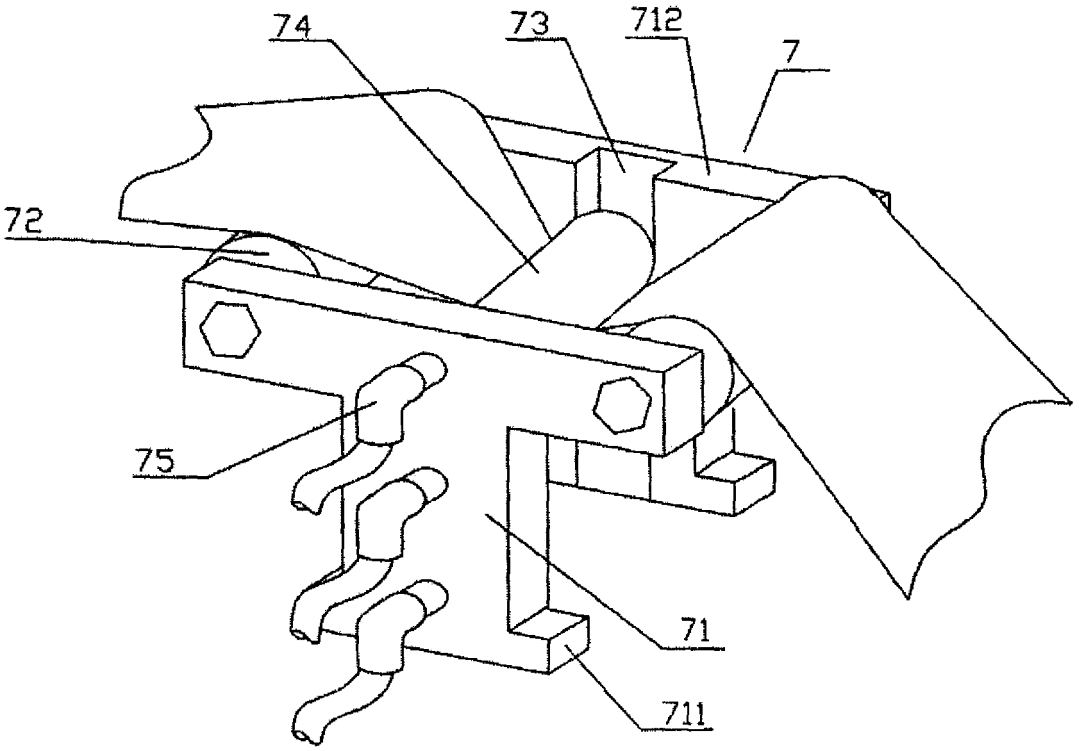

Fig 2

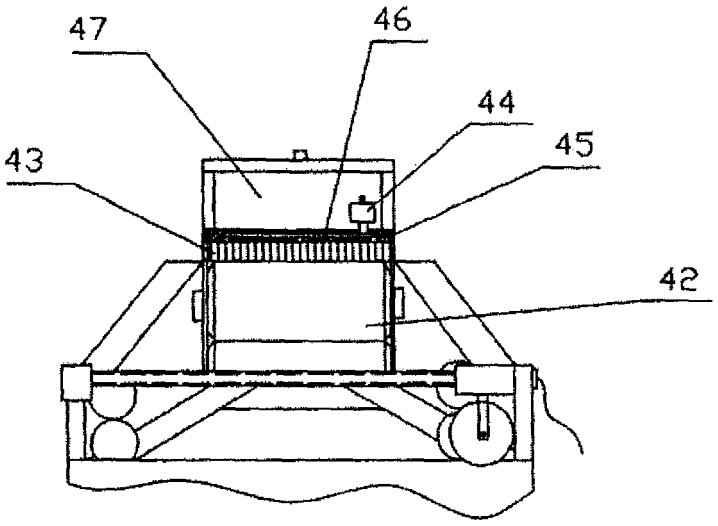

Fig 3

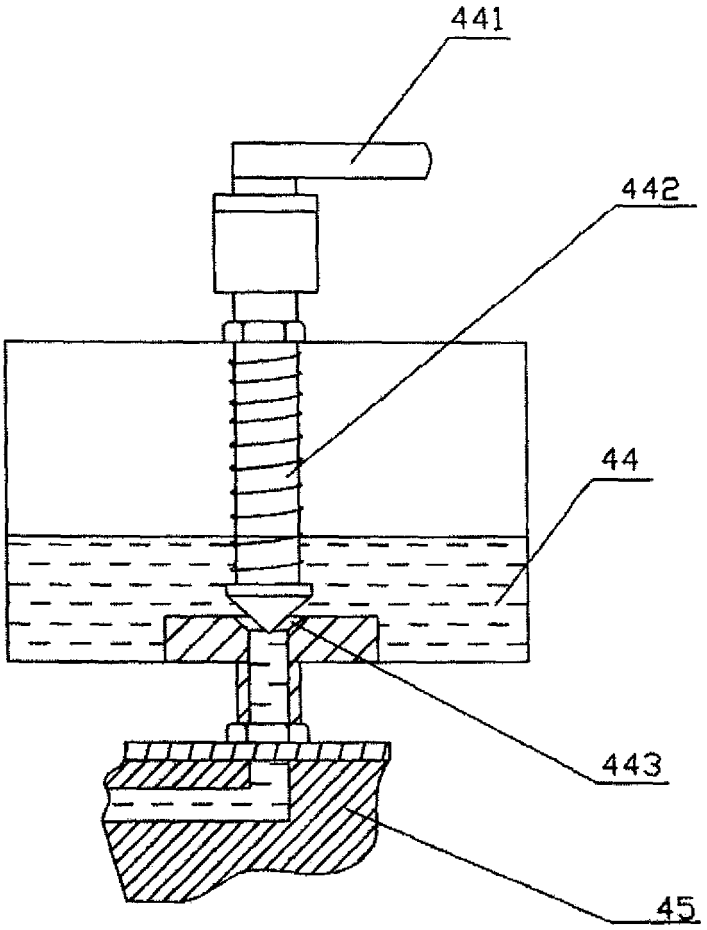

Fig 4

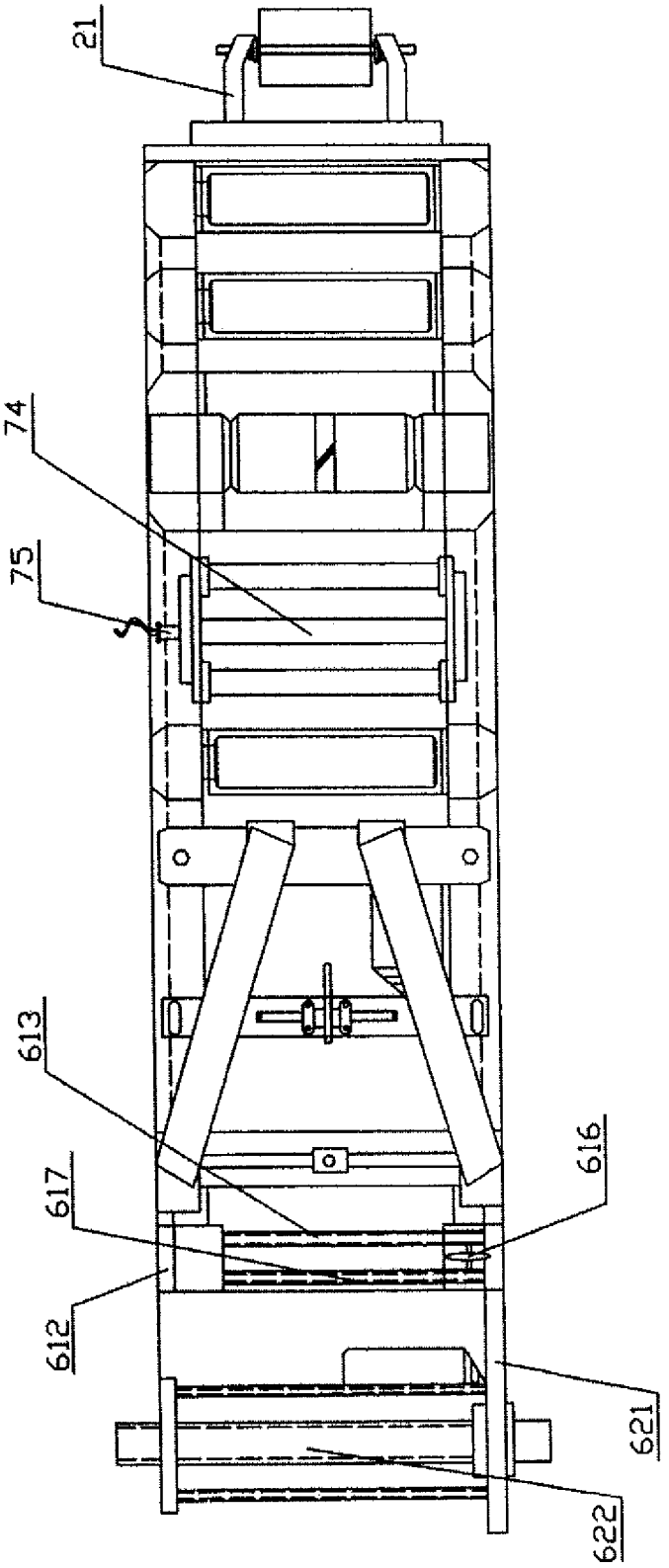

Fig 5

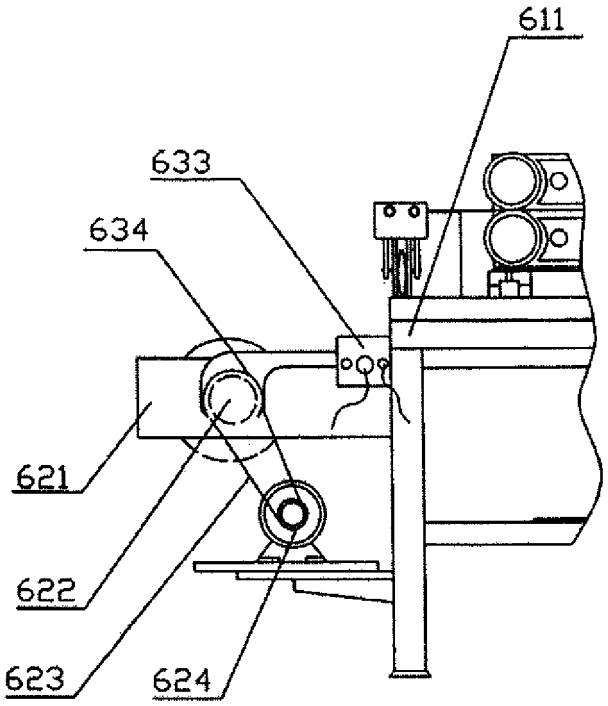

Fig 6

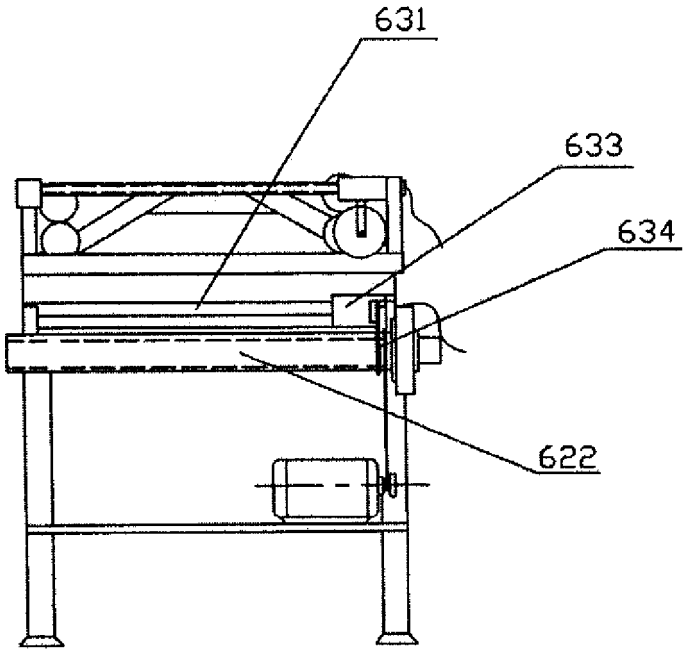

Fig 7

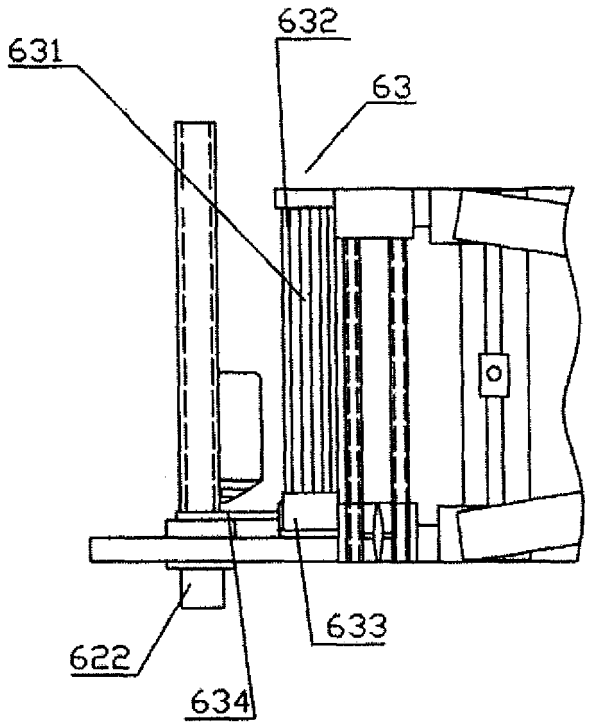

Fig 8

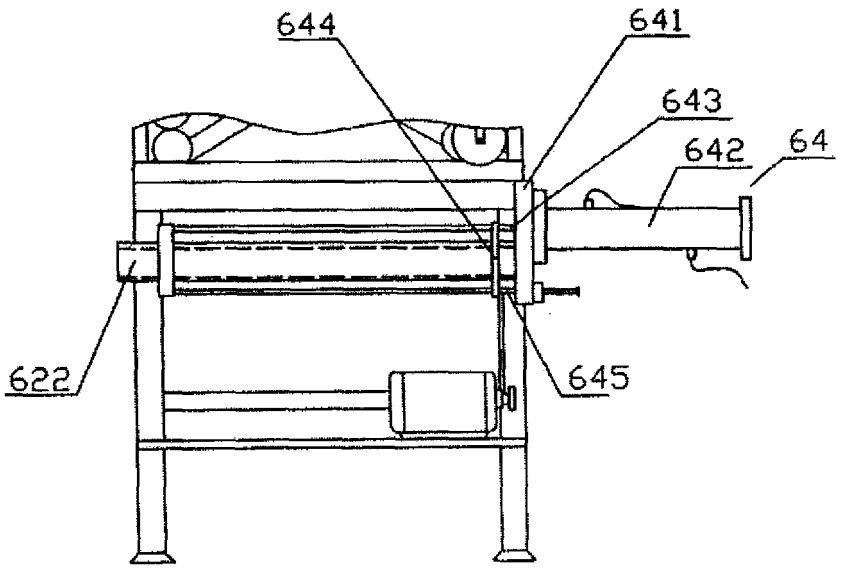

Fig 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2008/000405

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B21D, B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, PAJ, CNPAT: EXPLOSION ANTI PROOF MATERIAL WEB NET MESH SCREEN GUIDE ROLL CUT RECRIVE COLLECT SYNCHRONOUS CONTROL REGULATE ADJUST SENSOR

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO9505254 A1 (SPAETH MICHAEL) 23 Feb. 1995 (23.02.1995) see abstract and abstract figure	14-15
Y		1-13
Y	CN2354687Y (MA, Guoliang) 22 Dec.1999 (22.12.1999) see pages 1-2 and figure 1	1-13
A	CN1454728A (SHANTOU HUAAN ANTI-EXPLOSION SCIENCE AND TECHNOLOGY Ltd.) 12 Nov.2003 (12.11.2003) see the whole document	1-15
A	FR2134289 A1 (ETUDES ET FAB NAUTIQUES AUTOM) 08 Dec. 1972 (08.12.1972) see the whole document	1-15

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 Nov.2008 (20.11.2008)	**04 Dec. 2008 (04.12.2008)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer LI,Weiwei Telephone No. (86-10)62085325

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2008/000405

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN2928364Y (MA, Guoliang) 01 Aug. 2007 (01.08.2007) see the whole document	1-15

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2008/000405

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO9505254 A1	23.02.1995	AU7653794A	14.03.1995
		EP0700322A	13.03.1996
		JP8505326T	11.06.1996
		DE4327670A	23.02.1995
		DE4327670C	25.04.1996
CN2354687Y	22.12.1999	NONE	
CN1454728A	12.11.2003	NONE	
FR2134289 A1	08.12.1972	FR2134289B	28.12.1973
CN2928364Y	01.08.2007	NONE	

Form PCT/ISA/210 (patent family annex) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2008/000405

A. CLASSIFICATION OF SUBJECT MATTER

B21D31/04 (2006.01) i
B21D33/00 (2006.01) i
B21D47/00 (2006.01) i

Form PCT/ISA/210 (extra sheet) (April 2007)