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(54) **APPARATUS FOR CLEANING THE TRANSPARENT ENDLESS BELT FOR RAPID UV
POLYMERIZATION OF THE PAINT THAT COATS PRODUCTS WITH A MAINLY FLAT SURFACE**

VORRICHTUNG ZUR REINIGUNG DES TRANSPARENTEN ENDLOSBANDES ZUR SCHNELLEN
UV-POLYMERISATION VON FARBE ZUR BESCHICHTUNG VON PRODUKTEN MIT
MEHRHEITLICH FLACHER OBERFLÄCHE

APPAREIL DE NETTOYAGE DE LA COURROIE SANS FIN TRANSPARENTE POUR LA
POLYMERISATION UV RAPIDE DE LA PEINTURE QUI RECOUVRE DES PRODUITS PRÉSENTANT
UNE SURFACE SENSIBLEMENT PLATE

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(73) Proprietor: **SORBINI S.r.l.
61122 Pesaro (IT)**

(72) Inventors:
• **Sorbini, Roberto**
I-61122 PESARO (IT)
• **Filippini, Fabrizio**
I-61122 PESARO (IT)

(74) Representative: **Porsia, Attilio**
Via Caffaro 3/2
16124 Genova (IT)

(56) References cited:
WO-A2-2004/065025 IT-A1- BO20 120 292

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Description

[0001] The invention relates to systems for rapid drying by means of UV light catalysis of paints that coat panels made of wood or other material or other products with a mainly flat surface, of the type described in the patent applications WO 1990/15673 and WO 1999/61168 where, between the UV light source used to catalyse the layer of paint applied to the product being conveyed and the layer of paint, there is positioned in contact with this paint a belt, usually made of silicone material or in any case transparent to the catalysing radiation, which improves the catalytic process of the paint as it prevents it from coming into direct contact with the oxygen in the air. In particular, the invention relates to those systems in which said transparent belt, hereinafter always referred to with this name, is in the form of an endless belt, guided between two lower press rollers and at least a third upper roller with the function of tensioner. The prior art document WO 2004/065025 also provides for the possibility of using a said transparent belt with roughness or patterns on the outside in slight low relief, so as to be impressed on the painted surface, for example to give it the appearance with grains that simulate wood or natural stones. In these apparatus it has been found that on frequent occasions part of the paint located at the perimeter of the painted product tends to remain attached to the outer surface of said transparent belt, where it solidifies and remains firmly attached thereto, and that this phenomenon becomes more marked in proportion to the increase in the amount of paint deposited on the product. If these residues of paint were to be left on the transparent belt, they would tend to build up and to alter the shape of the active surface of this component, inevitably decreasing the permeability to UV light, with evident problems of cleaning and downtime occurring. To solve this problem, the same document WO 2004/065025 has provided for removal of any material that remains attached to the transparent belt, before this belt recirculates and, for this purpose, on the return branch of this transparent belt there have been provided cleaning means, generically comprising a rotating brush and a vacuum hood. As these means proved to be unsuitable to achieve the intended cleaning purposes, an attempt was made to overcome the limits of the prior art with the solution described in the Italian patent application N° IT BO20130205 A1 by the same applicant, which provides for performing cleaning essentially on the ascending branch of the conveyor belt and comprises, starting from the bottom, a first lightly engraved reverse roller made of steel, which draws solvent from a constant level reservoir to feed this solvent in small amounts and in a distributed and continuous manner, to the upper part of the area of contact with the transparent belt, where this first roller performs initial detachment of the paint to be eliminated by friction. Downstream of the first reverse roller there is provided a doctor blade, which forms an obtuse angle with the section of transparent belt that comes into contact therewith, and

which forms, with this belt, on the entire transverse extension thereof, a small dam that retains both the paint and the solvent and that causes most of the fluid material intercepted to flow downwards through gravity, where the upper layer of this material, essentially consisting of paint, is removed by a transverse suction bar. Downstream of said doctor blade, the transparent belt is involved externally and transversely, by a second reverse roller, with a smooth chrome-plated surface, which rotates slowly and has the function of removing the small amount of solvent and of diluted paint that passes beyond this doctor blade, and which is in turn kept clean by a scraper. In the use of this apparatus it has been noted that the last reverse roller has an inadequate cleaning effect on the transparent belt, which manages to draw beyond this final roller, a thin film of greatly diluted and fluid paint, which upon reaching the lower branch of this transparent belt is hardened by the UV light and which, due to the pressure exerted by the panels during the painting step, remains firmly bonded to the transparent belt, building up progressively thereon and forming a whitish film that progressively decreases the transparency to UV light of this transparent belt, making catalysis of the paint applied to the panels impossible.

[0002] From document IT BO20 120 292 A1 a method for avoiding the soiling of an UV-transparent tape during the deposition of a decorative film is disclosed. To this end, a "dethatching" product is applied top the ascending return branch of the tape. The corresponding apparatus is equipped with nozzles to apply the cleaning product.

[0003] From document WO 2004/065025 A2 an apparatus for coating wooden substrates by UV-radiation through an UV-transparent belt is known.

[0004] The present invention differs from the state of the art known from document IT BO20 120 292 A1 in that the cleaning system is different and in that the descending branch of the transparent and closed tape is cleaned.

[0005] The invention intends to solve these major limitations of the prior art, with the solution set down in the appended claim 1), which uses the following idea of solution. Cleaning is essentially performed on the descending branch of the transparent belt, by means of a first upper reverse roller and of a first bar that dispenses, between this roller and the transparent belt, solvent for the paint to be removed. This first reverse roller distributes the solvent evenly on the transparent belt and performs thereon a first rubbing action useful also to detach the paint, to spread it and to make it more easily and rapidly reactive to the action of the solvent and to distribute this diluted paint over a wide area of the transparent belt. Downstream of this first reverse unit, there is provided at least a first transverse doctor blade, which through the combined action of scraping and of gravity, removes from the transparent belt all the solvent and the diluted paint coming from said first reverse unit and which channels and removes all the material collected. Downstream of this first doctor blade there is provided a second trans-

verse reverse roller unit, optionally with a related further solvent dispensing bar, to perform a second mechanical rubbing and cleaning operation of the transparent belt and of diluting any residual fluid paint and downstream of this second reverse unit, if provided with said solvent dispensing bar, there is provided at least a second transverse doctor blade, which removes all the solvent and any traces of greatly diluted paint, which can thus be easily and completely removed. With an apparatus of this kind, good results have been obtained using as reverse rollers cylindrical metal rollers, covered with several windings of a cloth having a high absorption capacity of the liquids concerned, capable of performing a rubbing action on the surface of the transparent belt, of being sufficiently long lasting, without breaking and simultaneously having good properties of elasticity and compliance, so as to act with a wide contact surface and efficiently both on smooth and on embossed outer surfaces of the transparent belt.

[0006] These and other features of the invention, and the advantages deriving therefrom, will be more apparent from the following description of a preferred embodiment thereof, illustrated purely by way of non-limiting example, in the figures of the four accompanying drawings, wherein:

- Fig. 1 is a schematic side elevation of the improved apparatus in question;
- Fig. 2 shows an enlarged cross section of one of the reverse rollers used in the apparatus in question;
- Fig. 3 shows other details of the reverse roller of Fig. 2 in longitudinal section along the line III-III;
- Figs. 4 and 5 show different arrangements of the head and of the tail of the fabric that is wound around the reverse roller;
- Fig. 6 shows a front view of the possible embodiment of the means for supporting the end of the reverse roller with bushing or bearing;
- Fig. 7 shows a perspective view of one of the doctor blades used in the apparatus according to the invention;
- Fig. 8 shows the doctor blade of Fig. 7 in a lateral view from the direction indicated by the arrow K;
- Fig. 9 shows other details of the doctor blade of Fig. 7 in a transverse cross section along the line IX-IX.

[0007] In Fig. 1, the reference number 1 indicates the horizontal upper branch of the conveyor carrying the panels P painted on the upper side, which travel in the direction of the arrow F by this conveyor. The reference number 2 indicates the endless transparent belt, for catalysis, normally made of silicone material, guided on the three rollers 3, 3', 4 positioned substantially at the vertices of an isosceles triangle. In the active stages of the operation on the panels P, the lower rollers 3, 3' arrange the lower branch of the transparent belt 2 on a trajectory substantially parallel to the upper branch of the conveyor 1, so that this branch of the transparent belt 2, which has a

width greater than the width of the panels P being processed, intimately covers for the entire extension thereof the upper painted surface of these panels, while means are provided to ensure that the opposite branches of the conveyors 1 and 2, travel in the same direction F and at the same speed. The reference number 5 schematically indicates the UV lamp unit, which by means of reflectors of known type transversely irradiates, on the entire transverse extension of the lower branch of the transparent belt 2, a blade of UV radiation that passes through this transparent belt and acts on the coating paint of the panel P passing under this belt 2 and in contact therewith. As mentioned previously, the surface of the transparent belt 2 that abandons the panel P after drying of the paint by the unit 5 can remain soiled by excess paint that overflows from the perimeter of this panel P and by any dust present in the working environment.

[0008] The invention provides for cleaning of the transparent belt 2 essentially on its inclined descending branch 102, by means of a first upper apparatus 6 positioned laterally to this branch or belt 102 and mounted on a wheel-mounted structure 7 sliding on a rectilinear horizontal guide 8, fixed to the machine frame, orthogonal to the axes of the rollers 3, 3', 4 of the conveyor 2 and which by means of a pneumatic cylinder 9 can be carried from a resting position distanced from the transparent belt 102, to the operating position of Fig. 1, where the cleaning apparatus 6 is thrust with adequate pressure against the transparent belt to be cleaned 102. The cleaning apparatus 6 comprises a first reverse roller 10 and a second reverse roller 10', parallel to each other and to the axis of the rollers 3, 3', 4 and of which the first reverse roller 10 is positioned at a short distance from the roller 4 while the other reverse roller 10' is positioned at a suitable distance from the first to allow other operating components, to be described below, to be positioned between the two reverse rollers. The rollers 10, 10' rotate in the direction F' opposite the direction of travel of the conveyor belt 102, hence the term "reverse rollers", with a speed correlated to that of the transparent belt 2 and to the amount of paint to be removed. By means of a chain and pinion or belt and toothed pulley transmission 11, the reverse rollers 10, 10' take their rotation from a common gear motor 12 flanged on the wheel-mounted structure 7.

[0009] In the inlet formed by the upper part of the reverse roller 10 and by the upper section of the transparent belt 102, there is injected a controlled and appropriately distributed amount of solvent to dilute the paint to be removed, dispensed by a dispensing bar 13 supplied by a pump 14 that draws this solvent from a reservoir 15 and supplies it at the pressure controlled by a calibrated valve 16, to one or more on-off solenoid valves 17 controlled by a microprocessor 18. If necessary, a similar dispensing bar 13' can be provided to dispense a further distributed amount of solvent into the inlet formed by the upper part of the second reverse roller 10' and the transparent belt 102 and this second bar 13' is preferably supplied through one or more respective solenoid valves 17' also

controlled by the unit 18 and which are connected via a branch to the assembly 14-16 mentioned above. The unit 18 can be controlled by software that takes account of the sizes of the panels being painted, of their feed speed and which, through optional optoelectronic means, not shown, can detect the distribution and the amount of paint to be removed.

[0010] The transmission 11, by means of a guide roller 111 which can also act as tensioner, is kept at a distance from the section of transparent belt 102 between the reverse rollers 10, 10', to create a space useful to accommodate along this section of belt 102, for its entire transverse extension, at least one doctor blade 19, which forms at the top an obtuse angle with the section of belt 102 that it touches with its upper edge and which is mounted on the longitudinal edge of a channel 119 supported by the wheel-mounted structure 7 through drawer-like means. Due to said obtuse angle, the material detached from the belt by the scraping edge of the doctor blade, can run transversely on the doctor blade as a result of gravity and can thus be immediately removed from the belt, preventing the formation of dangerous build-ups. The paint diluted by the solvent and collected by the scraping action performed by the doctor blade 19, flows through gravity into the channel 119 maintaining this doctor blade clean and in optimum operating conditions. Moreover, at least the bottom 219 of the channel 119 is inclined longitudinally and provided at the lower end thereof with a drain 20 that causes the liquid collected to flow into a discharge tray 21 (see below). The reverse roller 10 must exert on the transparent belt 102 a rubbing action useful to break up and spread any lumps of paint, to distribute the solvent evenly on the belt and to perform an efficient diluting action of any said paint and, for this purpose, this first reverse roller 10 can be formed by a lightly engraved steel roller, as in the prior art solution IT BO20130205 A1, mentioned in the introductory part of this application, or can advantageously be formed by a reverse roller similar to the subsequent one 10', which must essentially perform functions of cleaning and of evenly distributing any further solvent dispensed by the relevant bar 13', to dilute any small residues of paint and to allow subsequent finishing means to operate in optimum conditions (see below).

[0011] Good results have been obtained by producing at least the reverse roller 10' or preferably both reverse rollers 10, 10' with a cylindrical core made of rigid material, such as metal, on which there is wound in several layers and stretched tightly, both in longitudinal and transverse direction, a fabric, for example in the form of a felted cloth, hereinafter for simplicity referred to as cloth, with a grammage sufficient to ensure that the reverse roller thus formed has good absorbency, good compliance and elasticity, to operate with a wide contact surface and also in depth even on any embossed surfaces of the transparent belt 102, and to ensure that the reverse roller has a good rubbing action on this belt 102 and high resistance to wear. Figs. 2, 3 and 4 show that the reverse

roller 10 or 10' is composed of a cylindrical metal core 110 with sections of smaller diameter 210, 210' at the ends, of which the roller 210 end with a coupling area 22, with a non-round section, useful for locking with the axial mated seat 311 of the bushing 211 of the pinion or of the pulley 411 of the transmission 11, to take the necessary rotation therefrom. The other tapered end section 210' of the roller 10 or 10' (see Fig. 5) can be provided with a bushing or bearing 23, which when the reverse roller is mounted on the wheel-mounted structure 7, is housed in a pincer-like support 24, openable and closable, as shown in Figs. 4 and 6. Figs. 2 and 3 show that the core 110 of the reverse roller 10 or 10' is provided with a longitudinal slot 25 in which the head 126 of the cloth 26 can be fixed, by means of a gripping bar 27 thrust and blocked by means of grub screws 28 screwed into threaded holes produced in this core 110 or with equivalent means. The cloth 26 has a width slightly below the longitudinal extension of the reverse roller 10 or 10' and is wound on the core 110 and on its tapered end extensions 210, 210', in the opposite direction to the direction of rotation F' of the reverse roller and so that it is stretched tightly both in longitudinal direction and transverse direction and the ends of this wound cloth 26 are blocked on the ends 210, 210' of the reverse roller by means of ties 29, for example cable ties. The cloth 26 is wound on the core 110 by about 5-10 turns, depending on the grammage of this cloth, so as to form a covering with the desired properties of compliance, elasticity and absorbency. To prevent excessive unevenness of the cylindrical surface formed by the covering cloth 26, the tail 226 of this cloth 26 is made to end at, just before and parallel to the head 126 of this cloth 26. Fig. 4 shows that the assembly 25, 126, 226 can have an arrangement parallel to the axis of the reverse roller 10, 10' or can have an inclined arrangement 226' as shown in Fig. 5, to ensure operation of the reverse roller without vibrations and a more continuous and evenly distributed scraping action thereof.

[0012] It can be appreciated from Fig. 1 how the first reverse roller 10 performs an effective action of scraping and spreading the solvent on the belt 102, carrying the mixture of paint and solvent downstream so that it wets the subsequent section of transparent belt 102 before being collected and removed by the doctor blade 19 and relevant channel 119 assembly. The elasticity and compliance of the covering formed by the cloth 26 and the pressure with which the reverse rollers are thrust against the transparent belt 102 cause the cloth covering 26 to be compressed slightly and operate on the transparent belt 102 with a wide contact surface.

[0013] Any excess solvent that falls from the reverse roller 10 is promptly collected by the subsequent inclined section of conveyor belt 102 and by the scraper assembly 19, 119 below. Instead, the second reverse roller 10' purely performs a cleaning action.

[0014] At the end of each operating cycle, the doctor blade 19 and the reverse rollers 10, 10' are cleaned man-

ually and, at predetermined intervals of time, for example after about 1 week of operation, the cloth of the reverse rollers is replaced, or the rollers are replaced with new reverse rollers with clean cloth.

[0015] If a respective solvent dispensing bar 13' is associated with the second reverse roller 10', downstream of the cleaning apparatus 6 it is necessary to provide a finishing and drying means, which collects and removes from the transparent belt 102 the aforesaid solvent and any small percentage of paint mixed therein and consequently greatly diluted and very fluid.

[0016] This finishing and drying action is carried out by at least a second cleaning doctor blade 19', which forms an obtuse angle with upper section of transparent belt 102 and which is mounted on the longitudinal edge of a channel 119' supported by a structure 30 mounted in a drawer-like fashion in the machine frame and also provided with a discharge duct 20 to cause the discharge material to flow into a discharge tray 21. Due to said obtuse angle, the material detached from the belt by the scraping edge of the doctor blade can run on this doctor blade as a result of its weight and of gravity and thus be immediately removed from the belt, preventing the formation of dangerous build-ups.

[0017] Figs. 7, 8 and 9 show greater details of the doctor blades 19, 19' fixed to an edge of the relevant channel 119, 119' with V-shaped profile, provided with a longitudinally inclined bottom 219, closed at the ends and provided on the lower end with a lower drain hole 20. The closing side members of the ends of the channels 119, 119' are provided with rotation pins 319 aligned with one another and with the longitudinal axis of these channels and which are supported by screw clamps 419 with related lock and release lever, associated with supports 519 fixed to the drawer-like structure 30, one of said pins 319 being provided with a lever 619 for correct orientation of the doctor blade assembly 19, 119, 19', 119' in relation to the transparent belt 102. Under the drain hole 20 there is positioned the collection and discharge tray 21, fixed to a cross member 719, in turn fixed to the nearby support 519.

[0018] To improve cleaning of the belt 102, with the second doctor blade 19' there can be combined suction means to form a suction blade that acts in a concentrated manner on the entire transverse extension of this belt 102, to clean it thoroughly, particularly if the belt has an embossed surface.

[0019] The apparatus is completed with counteracting means positioned on the inner side of the descending branch 102 of the transparent belt 2, for example formed of two or more rollers 31, to ensure that this belt 102 operates with the reverse rollers 10, 10' and with said doctor blades 19, 19' with the necessary evenly distributed contact and with the necessary pressure, also evenly distributed.

[0020] It is understood that the description refers to a preferred embodiment of the invention, to which numerous variants and constructional modifications can be

made, without departing from the guiding principle of the invention, as described, illustrated and as claimed below. In the claims, the references indicated in brackets are purely indicative and do not limit the scope of protection of these claims.

Claims

1. Apparatus for cleaning the descending branch (102) of an endless transparent belt (2) for rapid UV catalysis of the paint that coats panels (P) made of wood or another material or other products with a flat surface, **characterised by** the sequence, from top to bottom, of at least the following means:

- a first upper reverse roller (10) that involves the descending transparent belt (102) for the entire transverse extension thereof and a first bar (13) for dispensing into the upper inlet formed by this reverse roller and by the transparent belt (102) an amount of solvent useful for diluting the paint to be removed, this first reverse roller (10) having features such as to distribute the solvent evenly on the belt (102) and to perform thereon a first rubbing action also useful to detach the paint, to spread it and to make it more easily and rapidly reactive to the solvent and to distribute this diluted paint over a wide extension of the transparent belt (102);

- at least a first doctor blade (19) that involves the transparent belt (102) for the entire transverse extension thereof and that forms with the upper section of this transparent belt an obtuse angle, all so that with the combined action of scraping and gravity this doctor blade (19) collects and removes all the solvent and diluted paint coming from said first upper reverse roller (10);

- a second upper reverse roller (10') that involves the transparent belt (102) for the entire transverse extension thereof, to subject it to a substantial cleaning action;

- wherein at least said second upper reverse roller (10') or both said reverse rollers (10, 10') are formed by cylindrical metal rollers covered with several windings of a cloth, for example a felted cloth (26).

- a bar (13') combined with the second reverse roller (10') for dispensing further solvent into the upper inlet formed by this reverse roller (10') and by the transparent belt (102), all to perform a second mechanical operation of rubbing and of cleaning the transparent belt and of diluting any residual fluid paint, there being provided after these means,

- at least a second doctor blade (19') that touches the belt (102) for the entire transverse extension thereof.

- sion thereof and that forms an obtuse angle with the upper section of this transparent belt (102), to collect and remove all the solvent and any traces of greatly diluted paint easily and totally and to then perform a drying operation of this transparent belt (102).
2. Apparatus according to claim 1), wherein at least said second reverse roller (10') or both said reverse rollers (10, 10') are formed by cylindrical metal rollers, covered with several windings of a cloth, for example a felted cloth (26) having high absorption capacity of the liquids used, capable of performing a rubbing action on the surface of the transparent belt (102), of lasting for a long time without breaking and simultaneously having good properties of elasticity and compliance, to be able to act with a contact surface and efficiently both on smooth and on embossed outer surfaces of the transparent belt (102) to be cleaned.
 3. Apparatus according to claim 2), wherein the reverse roller (10') or both reverse rollers (10, 10') are formed by a cylindrical metal core (110) with coaxial extensions of smaller diameter (210, 210') on the opposite ends, said core (110) being provided with a longitudinal slot (25) in which the head (126) of the felted cloth (26) can be fixed, by means of a gripping means (27, 28), it being provided that said cloth (26) has a width slightly below the longitudinal extension of the reverse roller (10, 10') and is wound on said core (110) and on the tapered end extensions thereof (210, 210'), in the opposite direction to the direction of rotation (F') of these reverse rollers and so that it is stretched tightly both in longitudinal direction and in transverse direction and the ends of this wound cloth (26) are blocked on said ends (210, 210') of the reverse rollers (10, 10') by means of ties (29).
 4. Apparatus according to claim 3), wherein said cloth (26) is wound on the core (110) of the reverse rollers (10, 10') by about 5-10 turns, depending on the gram-mage of this cloth, so as to form a covering with the desired properties of compliance, elasticity and absorbency.
 5. Apparatus according to claim 3), **characterised in that** to prevent excessive unevenness of the cylindrical surface formed by said covering cloth (26) the tail (226) of this cloth (26) is made to end at and just before the head (126) of this cloth (26) and parallel thereto.
 6. Apparatus according to claim 3), wherein at said slot (25) and with this the head (126) and the tail (226) of the covering cloth (26) of the reverse rollers (10, 10') can have an arrangement parallel or inclined with respect to the rotation axis of these reverse rollers, to ensure in this last case an operation of these reverse rollers (10, 10') without vibrations and a more continuous distributed scraping action thereof.
 7. Apparatus according to one or more of the preceding claims, wherein the assembly (6) of the reverse rollers (10, 10') and of the first doctor blade (19) are mounted on a wheel-mounted structure (7) sliding on a rectilinear and horizontal guide (8) fixed to the machine frame, orthogonal to the axis of the guide rollers (3, 3', 4) of the transparent belt (2) and which by means of a pneumatic cylinder (9) can be carried from a resting position distanced from the transparent belt (102) to be cleaned, to an operating position where said cleaning apparatus (6) is thrust with adequate pressure against the transparent belt (102) to be cleaned, there being mounted on said wheel-mounted structure (7) a gear motor (12), which through a transmission (11) operates both reverse rollers (10, 10') and there being mounted with a drawer-like arrangement (30) said first doctor blade (19), while the second doctor blade (19') is mounted with a drawer-like arrangement (30) on the machine frame with the transparent belt to be cleaned (2).
 8. Apparatus according to one or more of the preceding claims, wherein said doctor blades (19, 19') are fixed on an edge of a channel (119, 119') provided with a longitudinally inclined bottom (219), closed at the ends and provided on the lower end with a drain hole 20, the closing side members of the ends of the channels (119, 119') being provided with rotation pins (319) aligned with one another and with the longitudinal axis of this channel and which are supported by clamps (419) with related lock and release lever, associated with supports (519) fixed to a drawer-like structure (30), one of said pins (319) being provided with a lever (619) for correct orientation of the doctor blade assembly (19, 119, 19', 119') in relation to the belt to be cleaned (102), there being positioned under said drain hole (20) a collection and discharge tray (21), fixed to a cross member (719), in turn fixed to the nearest of said supports (519).
 9. Apparatus according to one or more of the preceding claims, **characterised by** comprising counteracting means positioned on the inner side of the descending belt (102) to be cleaned of the transparent belt (2), these counteracting means preferably being formed of two or more rollers (31), to ensure that said transparent belt (102) operates with said reverse rollers (10, 10') and with said doctor blades (19, 19') with the necessary distributed contact and with the necessary pressure.

Patentansprüche

1. Eine Vorrichtung zur Reinigung des absteigenden Zweigs (102) eines transparenten Endlosbandes (2) zur schnellen UV-Katalyse von Farbe zur Beschichtung von Platten (P) aus Holz oder anderem Material oder von anderen Produkten mit flacher Oberfläche, **gekennzeichnet durch** die Abfolge, von oben nach unten, von mindestens folgenden Elementen:

- Einer ersten rückläufigen Rolle (10), welche das absteigende transparente Band (102) über dessen gesamte Querausdehnung involviert und einer ersten Stange (13) zum Spenden in den oberen Einlass, der durch diese rückläufige Rolle und das transparente Band (102) gebildet wird, einer entsprechenden Menge Lösungsmittel, das benötigt wird, um die zu entfernende Farbe zu verdünnen, wobei diese erste rückläufige Rolle (10) derartige Eigenschaften aufweist, dass das Lösungsmittel gleichmäßig auf dem Band (102) verteilt wird und darauf eine erste Abriebwirkung erfolgt, welche ebenfalls nützlich ist, um die Farbe zu lösen, sie zu verstreichen und leichter und schneller auf das Lösungsmittel reagieren zu lassen, und diese verdünnte Farbe dann über eine umfangreiche Ausdehnung des transparenten Bandes (102) zu verteilen;

- Mindestens einem ersten Abstreicher (19), welcher das transparente Band (102) über dessen gesamte Querausdehnung involviert und der mit dem oberen Abschnitt dieses transparenten Bandes einen stumpfen Winkel bildet, und zwar so, dass dieser Abstreicher (19) mit der kombinierten Wirkung des Schabens und der Schwerkraft das gesamte Lösungsmittel und die verdünnte, von der genannten oberen rückläufigen Rolle (10) stammende Farbe sammelt und entfernt;

- Einer zweiten oberen rückläufigen Rolle (10'), welche das transparente Band (102) über dessen gesamte Querausdehnung involviert, um es einer umfangreichen Reinigungswirkung zu unterziehen;

- wobei mindestens die genannte zweite obere rückläufige Rolle (10') oder die beiden genannten rückläufigen Rollen (10, 10') jeweils durch zylindrische Metallrollen gebildet werden, welche mit mehreren Wicklungen eines Stoffs beschichtet sind, und zwar beispielsweise eines Filzstoffs (26).

- Eine Stange (13') mit der zweiten rückläufigen Rolle (10') zum Spenden von weiterem Lösungsmittel in den oberen, durch diese rückläufige Rolle (10') und das transparente Band (102) gebildeten Einlass kombiniert ist, und zwar um einen zweiten mechanischen Vorgang des Abreibens und Reinigens des transparenten Ban-

des sowie des Verdünnens von jeglicher flüssigen Restfarbe vorzunehmen, wobei nach diesen Elementen folgendes vorgesehen ist:

- Mindestens ein zweiter Abstreicher (19'), welcher das Band (102) über dessen gesamte Querausdehnung berührt und einen stumpfen Winkel mit dem oberen Abschnitt dieses transparenten Bandes (102) bildet, um das gesamte Lösungsmittel sowie jegliche Spur der in hohem Maß verdünnten Farbe problemlos und vollkommen zu sammeln und zu entfernen und anschließend dieses transparente Band (102) einem Trocknungsvorgang zu unterziehen.

2. Eine Vorrichtung gemäß Anspruch 1), wobei mindestens die genannte zweite rückläufige Rolle (10') oder beide der genannten rückläufigen Rollen (10, 10') jeweils durch zylindrische Metallrollen gebildet werden, welche jeweils mit mehreren Wicklungen eines Stoffs beschichtet sind, wie beispielsweise mit einem Filzstoff (26), der eine hohe Saugfähigkeit der angewendeten Flüssigkeiten aufweist und fähig ist, eine Abriebwirkung auf die Oberfläche des transparenten Bandes (102) auszuüben, lange Zeit haltbar ohne zu zerreißen ist und gleichzeitig gute Elastizitäts- und Konformitätseigenschaften aufweist, um in der Lage zu sein, mit einer Kontaktfläche zusammenzuwirken und zwar in effizienter Weise sowohl auf glatten wie auf geprägten äußeren Oberflächen des zu reinigenden transparenten Bandes (102).

3. Eine Vorrichtung gemäß Anspruch 2), wobei die rückläufige Rolle (10') beziehungsweise die beiden rückläufigen Rollen (10, 10') jeweils durch einen zylindrischen Metallkern (110) mit coaxialen Ausdehnungen eines geringeren Durchmessers (210, 210') an den entgegengesetzten Enden gebildet werden, und der genannte Kern (110) mit einem Längsschlitz (25) ausgestattet ist, in dem das jeweilige Kopfende (126) des Filzstoffs (26) mit Hilfe entsprechender Klemmelemente (27, 28) fixiert werden kann, da vorgesehen ist, dass der genannte Stoff (26) eine Breite aufweist, welche leicht unter der Längsausdehnung der rückläufigen Rolle (10, 10') liegt und um den genannten Kern (110) und dessen spitz zulaufende Endausdehnung (210, 210') gewickelt ist, und zwar in der entgegengesetzten Richtung der Umdrehungsrichtung (F') dieser rückläufigen Rollen und so, dass er in der Längs- und Querrichtung fest angezogen wird und die Enden dieses gewickelten Stoffs (26) jeweils an den genannten Enden (210, 210') der rückläufigen Rollen (10, 10') mit Hilfe von Bindungen (29) verankert werden.

4. Eine Vorrichtung gemäß Anspruch 3), wobei der genannte Stoff (26) jeweils 5 - 10 mal um den Kern (110) der rückläufigen Rollen (10, 10') gewickelt wird, je nach Grammatik dieses Stoffs, so dass eine

Schicht mit den gewünschten Konformitäts-, Elastizitäts- und Saugfähigkeitseigenschaften gebildet wird.

5. Eine Vorrichtung gemäß Anspruch 3), **dadurch gekennzeichnet, dass**, um eine übermäßige Unebenheit der zylindrischen Oberfläche zu vermeiden, welche durch den genannten Deckstoff (26) gebildet wird, das Ende (226) dieses Stoffs (26) jeweils an und genau vor dem Kopfende (126) dieses Stoffs (26) sowie parallel dazu endet. 5 10
6. Eine Vorrichtung gemäß Anspruch 3), wobei der genannte Schlitz (25) und damit das Kopfende (126) und das Ende (226) des Deckstoffs (26) der rückläufigen Rollen (10, 10') eine Anordnung aufweisen können, welche jeweils parallel oder geneigt in Bezug auf die Umdrehungsachse dieser rückläufigen Rollen ist, um in diesem letzten Fall einen vibrationsfreien Betrieb dieser rückläufigen Rollen (10, 10') sowie deren kontinuierlichere verteilte Abschabungswirkung zu garantieren. 15 20
7. Eine Vorrichtung gemäß einem oder mehreren der vorausgegangenen Ansprüche, wobei der Bausatz (6) der rückläufigen Rollen (10, 10') und des ersten Abstreichers (19) jeweils auf eine radgelagerte Struktur (7) montiert sind, welche auf einer geradlinigen und horizontalen Führung (8) gleitet, die am Maschinenrahmen befestigt ist, und zwar jeweils orthogonal zu der Achse der Führungsrollen (3, 3', 4) des transparenten Bands (2) und welche mit Hilfe eines pneumatischen Zylinders (9) von einer Ruhestellung, die von dem zu reinigenden transparenten Band (102) entfernt ist, in eine Betriebsstellung gebracht werden kann, in der die genannte Reinigungsvorrichtung (6) mit entsprechendem Druck gegen das zu reinigende transparente Band (102) gepresst wird, wobei auf die genannte radgelagerte Struktur (7) ein Getriebemotor (12) montiert ist, welcher durch ein entsprechendes Getriebe (11) die beiden rückläufigen Rollen (10, 10') antreibt, und wobei der genannte erste Abstreicher (19) dort mit einer schubförmigen Anordnung (30) montiert ist, während der genannte zweite Abstreicher (19') mit einer schubförmigen Anordnung (30) an den Maschinenrahmen mit dem zu reinigenden transparenten Band (2) montiert ist. 25 30 40 45
8. Eine Vorrichtung gemäß einem oder mehreren der vorausgegangenen Ansprüche, wobei die genannten Abstreicher (19, 19') an einer Kante eines Kanals (119, 119') befestigt sind, welcher mit einem längs geneigten Boden (219) versehen ist, der an den Enden geschlossen und am unteren Ende mit einer Abflussöffnung (20) ausgestattet ist, wobei Verschluss-Seitenglieder der Enden des Kanals (119, 119') mit entsprechenden Drehzapfen (319) ausgerüstet 50 55

sind, welche miteinander und mit der Längsachse dieses Kanals ausgerichtet sind und durch Klammern (419) mit entsprechendem Verriegelung und Entriegelungshebel gehalten werden, die mit Halterungen (519) verbunden sind, welche an einer schubförmigen Struktur (30) befestigt sind, wobei einer der genannten Zapfen (319) mit einem Hebel (619) für die korrekte Orientierung des Abstreichersatzes (19, 119, 19', 119') in Bezug auf das zu reinigende Band (102) versehen ist, und unter der genannten Abflussöffnung (20) eine Sammel- und Ablassschale (21) angeordnet ist, die an einem Querglied (719) befestigt ist, welches wiederum an der nächsten der genannten Halterungen (519) befestigt ist.

9. Eine Vorrichtung gemäß einem oder mehreren der vorausgegangenen Ansprüche, **dadurch gekennzeichnet, dass** sie gegenwirkende Elemente umfasst, welche an der inneren Seite des zu reinigenden absteigenden Bands (102) des transparenten Bands (2) angeordnet sind, wobei diese gegenwirkenden Elemente vorzugsweise aus einer oder mehreren Rollen (31) bestehen, um zu gewährleisten, dass das genannte transparente Band (102) mit den genannten rückläufigen Rollen (10, 10') und mit den genannten Abstreichern (19, 19') mit dem notwendigen verteilten Kontakt und dem notwendigen Druck arbeitet.

Revendications

1. Appareil de nettoyage de la branche descendante (102) d'une courroie sans fin transparente (2) pour la catalyse UV rapide de la peinture qui recouvre des panneaux (P) constitués de bois ou d'un autre matériau ou d'autres produits avec une surface plane, **caractérisé par** la séquence, de haut en bas, d'au moins un des moyens suivants :

- un premier rouleau inversé supérieur (10) qui engage la courroie transparente descendante (102) sur toute l'extension transversale de celle-ci et une première barre (13) pour distribuer dans l'ouverture supérieure formée par ce rouleau inversé et par la courroie transparente (102) une quantité de solvant utile pour diluer la peinture à éliminer, ce premier rouleau inversé (10) ayant des caractéristiques permettant de distribuer le solvant uniformément sur la courroie (102) et d'exercer sur celle-ci une première action de frottement également utile pour détacher la peinture, de l'étaler et de la rendre plus facilement et rapidement réactive au solvant et de distribuer cette peinture diluée sur une large extension de la courroie transparente (102) ;
- au moins une première racle (19) qui engage

- la courroie transparente (102) sur toute l'extension transversale de celle-ci et qui forme avec la section supérieure de cette courroie transparente un angle obtus, le tout de manière que, avec l'action combinée de raclage et de la gravité, cette racle (19) recueille et enlève tout le solvant et la peinture diluée provenant dudit premier rouleau inversé supérieur (10) ;
- un deuxième rouleau inversé supérieur (10') qui engage la courroie transparente (102) sur toute l'extension transversale de celle-ci, pour la soumettre à une action de nettoyage substantiel ;
 - dans lequel au moins ledit deuxième rouleau inversé supérieur (10') ou lesdits deux rouleaux inversés (10, 10') sont formés par des rouleaux métalliques cylindriques revêtus avec plusieurs enroulements d'un tissu, par exemple un tissu feutré (26),
 - une barre (13') combinée avec le deuxième rouleau inversé supérieur (10') pour distribuer d'autre solvant dans l'ouverture supérieure formée par ce rouleau inversé (10') et par la courroie transparente (102), le tout de manière à effectuer une deuxième opération mécanique de frottage et de nettoyage de la courroie transparente et de dilution de toute la peinture fluide résiduelle, étant prévue ici après ces moyens,
 - au moins une deuxième racle (19') qui touche la courroie (102) sur toute l'extension transversale de celle-ci et qui forme un angle obtus avec la section supérieure de cette courroie transparente (102), pour recueillir et enlever facilement et totalement tout le solvant et toutes traces de peinture fortement diluée et pour effectuer ensuite une opération de séchage de cette courroie transparente (102).
2. Appareil selon la revendication 1, dans lequel au moins ledit deuxième rouleau inversé (10') ou lesdits deux rouleaux inversés (10, 10') sont formés par des rouleaux métalliques cylindriques, revêtus avec plusieurs enroulements d'un tissu, par exemple un tissu feutré (26) ayant une capacité d'absorption élevée des liquides utilisés, capable d'effectuer une action de frottage sur la surface de la courroie transparente (102), de persistance pendant un temps prolongé sans rupture et ayant simultanément de bonnes propriétés d'élasticité et de complaisance, pour être capable d'agir avec une surface de contact et efficacement à la fois sur des surfaces extérieures lisses et bosselées de la courroie transparente (102) à nettoyer.
 3. Appareil selon la revendication 2, dans lequel le rouleau inversé (10') ou les deux rouleaux inversés (10, 10') sont formés par un noyau métallique cylindrique (110) avec des extensions coaxiales de plus petit diamètre (210, 210') sur les extrémités opposées, ledit noyau (110) étant pourvu d'une fente longitudinale (25) dans laquelle la tête (126) du tissu feutré (26) peut être fixée, au moyen d'un moyen de serrage (27, 28), étant prévu que ledit tissu (26) a une largeur légèrement inférieure à l'extension longitudinale du rouleau inversé (10, 10') et est enroulé sur ledit noyau (110) et sur les extensions terminales coniques de celui-ci (210, 210'), dans la direction opposée à la direction de rotation (F') de ces rouleaux inversés et de manière qu'il soit légèrement étiré à la fois en direction longitudinale et en direction transversale et les extrémités de ce tissu enroulé (26) soient bloquées sur lesdites extrémités (210, 210') des rouleaux inversés (10, 10') au moyen de liens (29).
 4. Appareil selon la revendication 3, dans lequel ledit tissu (26) est enroulé sur le noyau (110) des rouleaux inversés (10, 10') sur au moins 5-10 tours, en fonction du grammage de ce tissu, de manière à former un revêtement avec les propriétés désirées de complaisance, d'élasticité et d'absorption.
 5. Appareil selon la revendication 3, **caractérisé en ce que**, pour éviter une irrégularité excessive de la surface cylindrique formée par ledit tissu de revêtement (26), la queue (226) de ce tissu (26) est réalisée pour terminer au niveau et juste avant la tête (126) de ce tissu (26) et parallèlement à celle-ci.
 6. Appareil selon la revendication 3, dans lequel au niveau de ladite fente (25) et avec ceci la tête (126) et la queue (226) du tissu de revêtement (26) des rouleaux inversés (10, 10') peuvent avoir un agencement parallèle ou incliné par rapport à l'axe de rotation de ces rouleaux inversés, pour garantir dans ce dernier cas un fonctionnement de ces rouleaux inversés (10, 10') sans vibrations et une action de raclage distribuée plus continue de ceux-ci.
 7. Appareil selon une ou plusieurs des revendications précédentes, dans lequel l'ensemble (6) des rouleaux inversés (10, 10') et de la première racle (19) est monté sur une structure montée sur roues (7) coulissant sur un guide rectiligne et horizontal (8) fixé au châssis de machine, orthogonal à l'axe des rouleaux de guidage (3, 3', 4) de la courroie transparente (2) et qui, au moyen d'un cylindre pneumatique (9), peut être transporté d'une position de repos éloignée de la courroie transparente (102) à nettoyer à une position de fonctionnement dans laquelle ledit appareil de nettoyage (6) est poussé avec une pression adéquate contre la courroie transparente (102) à nettoyer, un motoréducteur (12) étant monté sur ladite structure montée sur roues (7), lequel actionne par l'intermédiaire d'une transmission (11) les deux rouleaux inversés (10, 10') et ladite première racle

(19) étant montée ici avec un agencement de type à tiroir (30), alors que la deuxième racle (19') est montée avec un agencement de type à tiroir (30) sur le châssis de machine avec la courroie transparente à nettoyer (2).

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8. Appareil selon une ou plusieurs des revendications précédentes, dans lequel lesdites racles (19, 19') sont fixées sur un bord d'un canal (119, 119') muni d'un fond incliné longitudinalement (219), fermé aux extrémités et pourvu sur l'extrémité inférieure d'un trou d'évacuation 20, les éléments latéraux de fermeture des extrémités des canaux (119, 119') étant munis d'axes de rotation (319) alignés entre eux et avec l'axe longitudinal de ce canal et qui sont supportés par des pinces (419) avec levier correspondant de verrouillage et de libération, associées à des supports (519) fixés à une structure de type à tiroir (30), un desdits axes (319) étant muni d'un levier (619) pour une orientation correcte de l'ensemble de racles (19, 119, 19', 119') par rapport à la courroie à nettoyer (102), sous ledit trou d'évacuation (20) étant disposé un bac de collecte et de décharge (21), fixé à une traverse (719), fixée à son tour au plus proche desdits supports (519).

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9. Appareil selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comprend des moyens de contrebalancement positionnés sur le côté intérieur de la courroie descendante (102) à nettoyer de la courroie transparente (2), ces moyens de contrebalancement étant formés de préférence par au moins deux rouleaux (31), pour garantir que ladite courroie transparente (102) fonctionne avec lesdits rouleaux inversés (10, 10') et lesdites racles (19, 19') avec le contact distribué nécessaire et avec la pression nécessaire.

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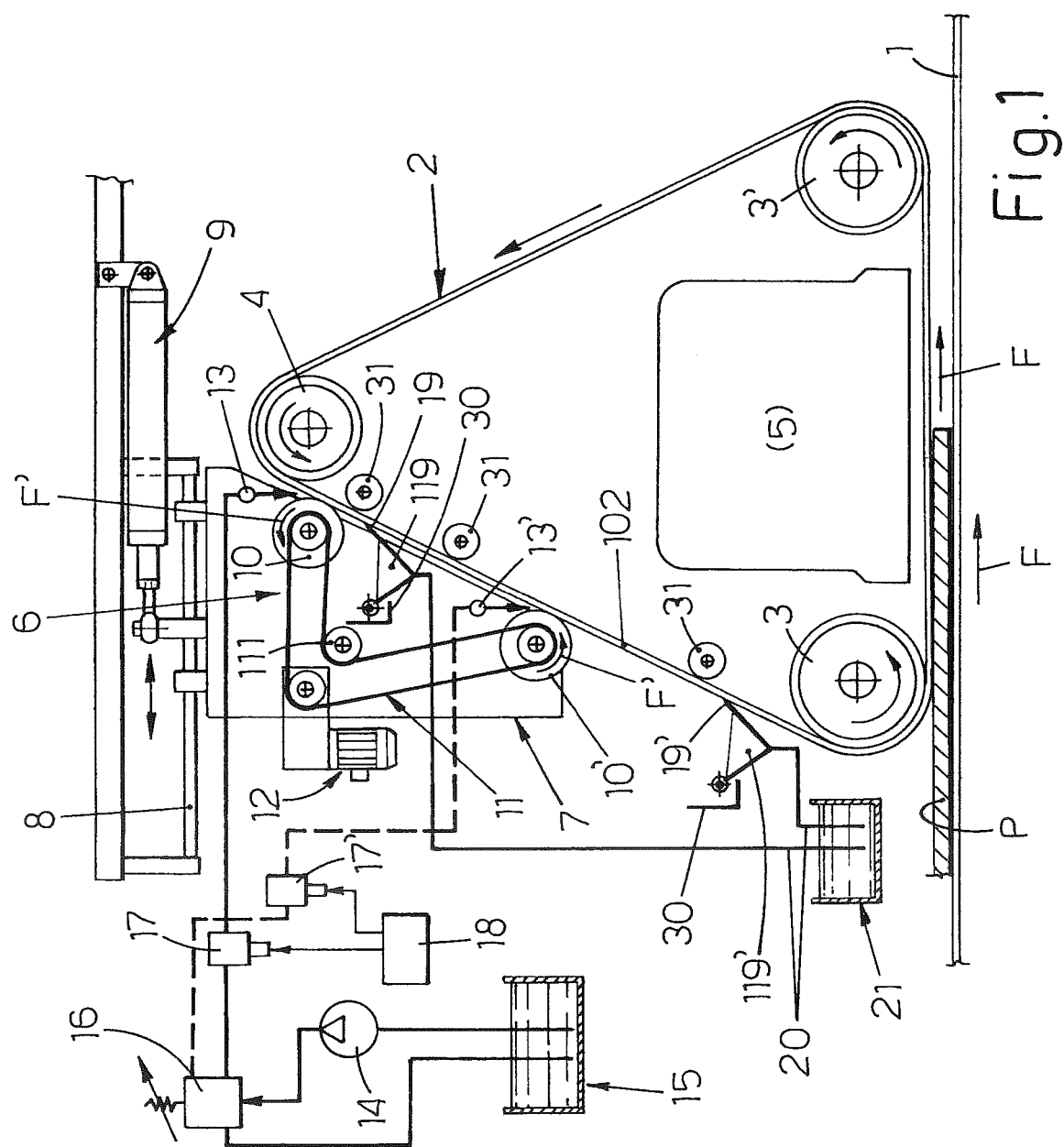
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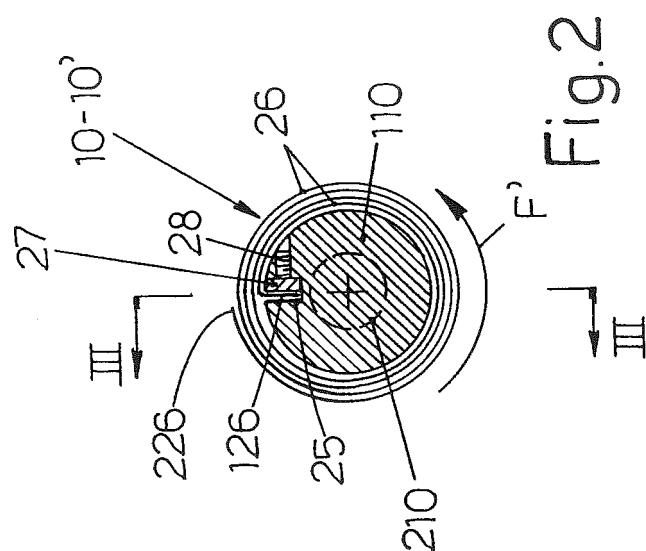
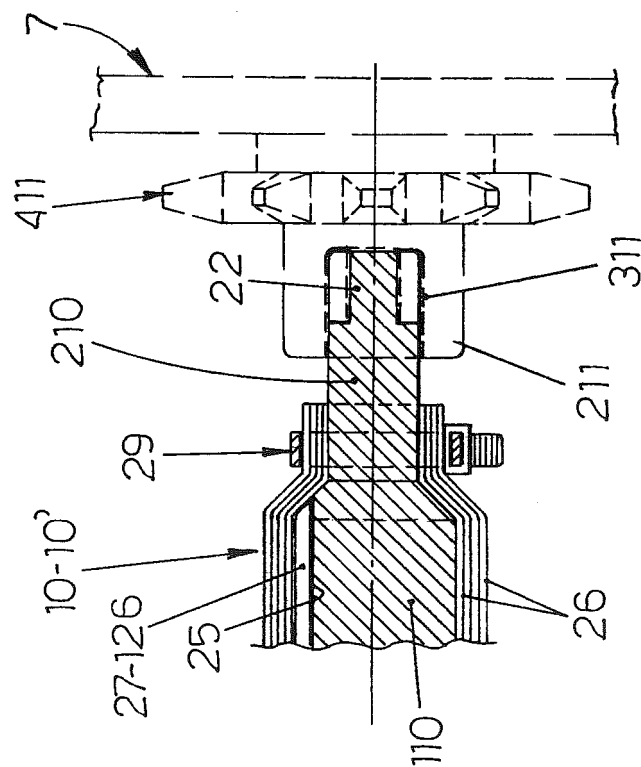
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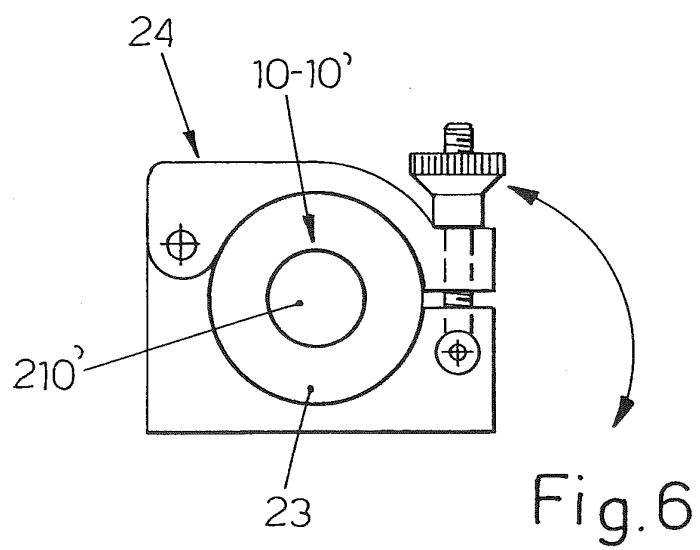
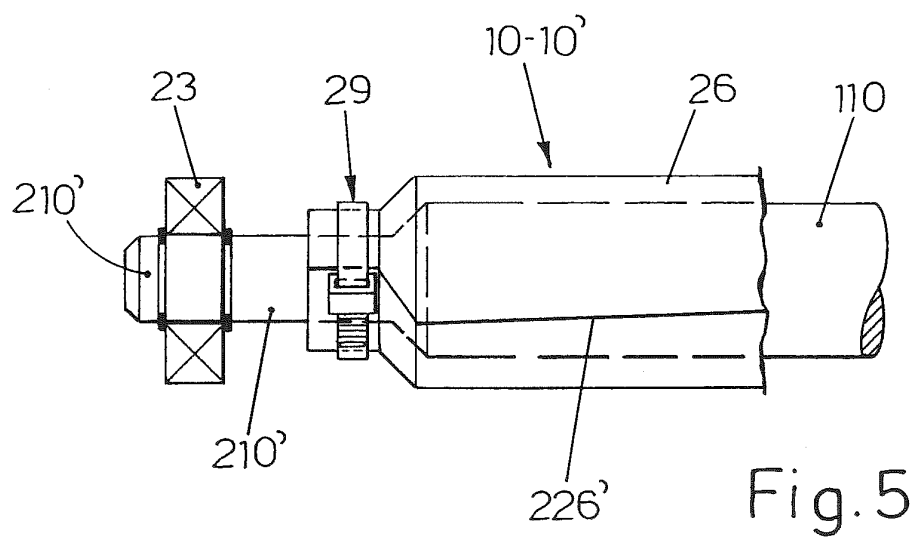
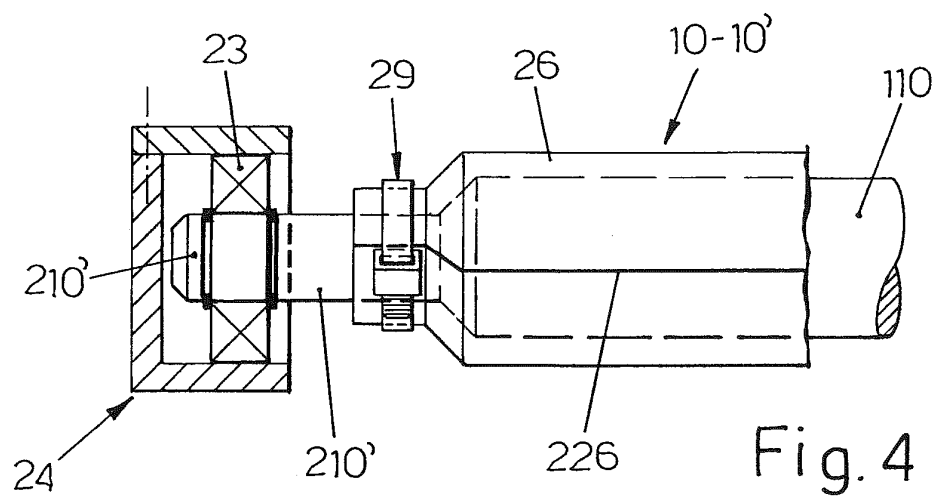
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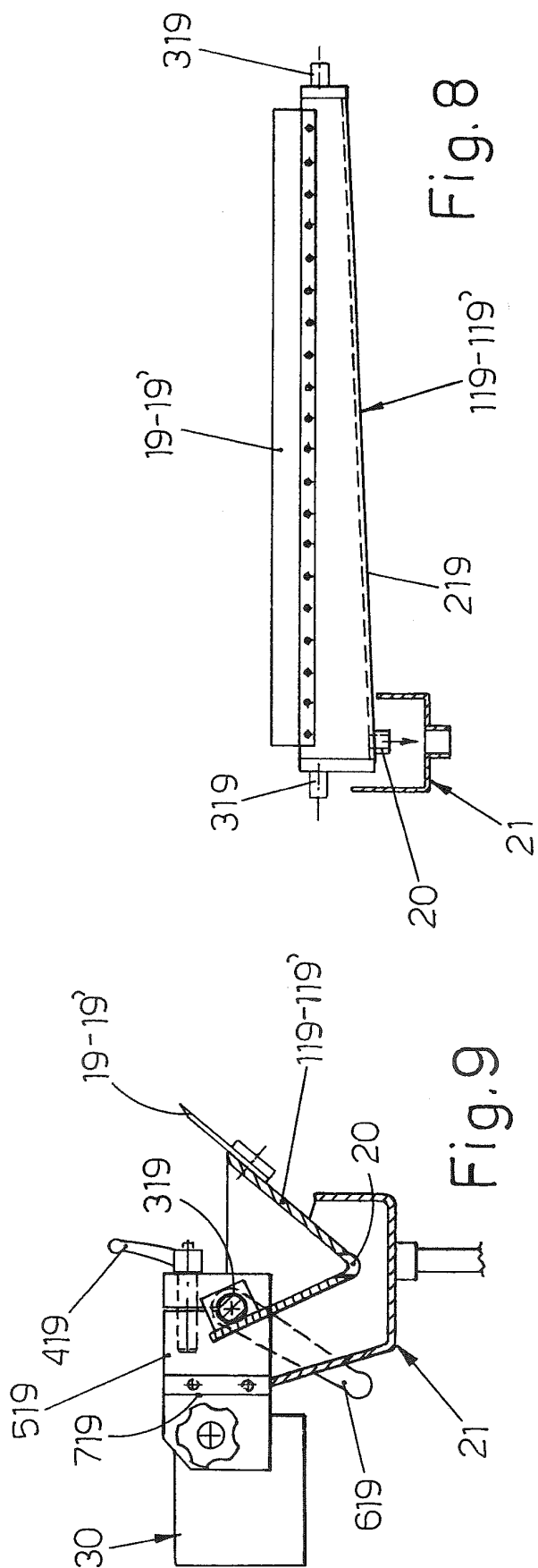
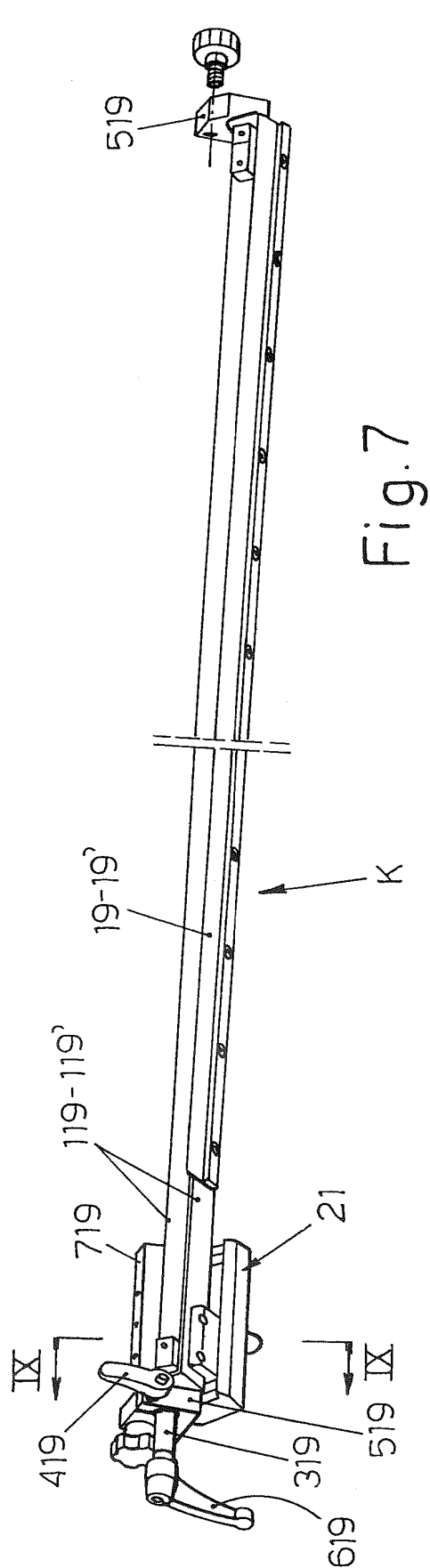
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Patent documents cited in the description

- WO 199015673 A [0001]
- WO 199961168 A [0001]
- WO 2004065025 A [0001]
- IT BO20130205 A1 [0001] [0010]
- IT BO20120292 A1 [0002] [0004]
- WO 2004065025 A2 [0003]