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(54) **TRANSPORT OF A WRAPPING-PAPER WEB IN THE TOBACCO INDUSTRY**

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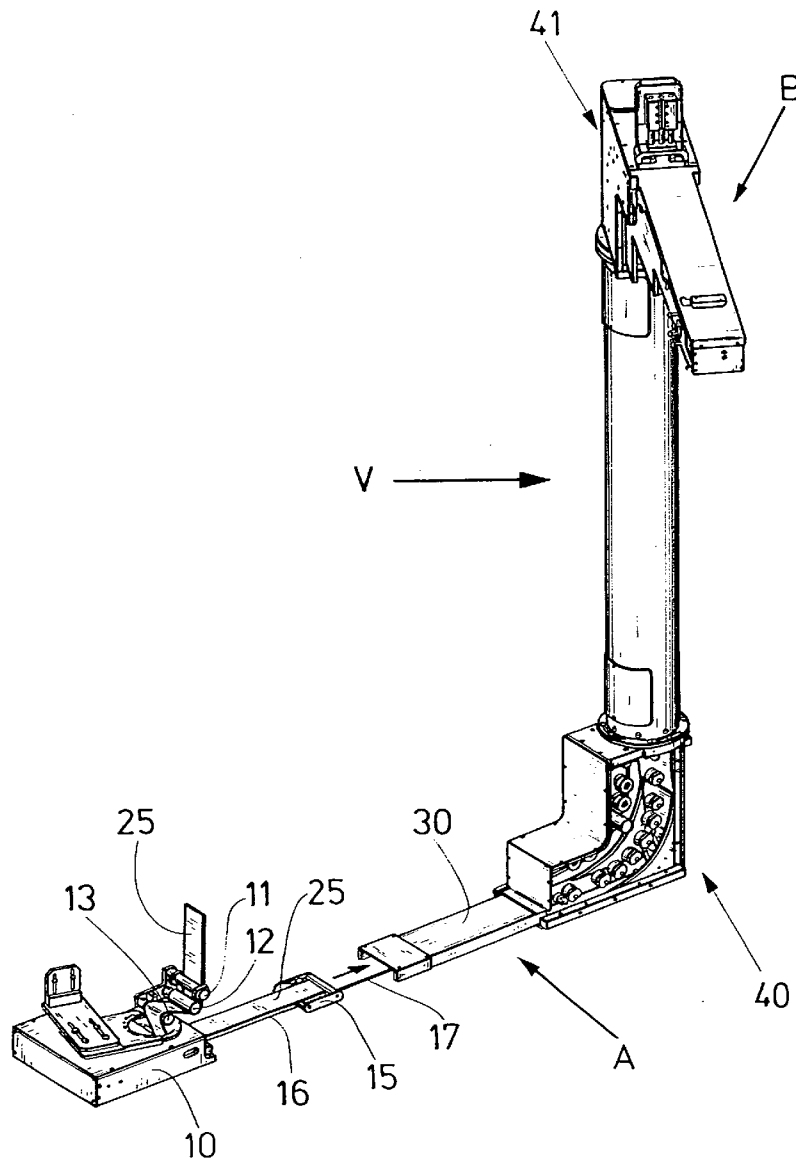
(57) **ABSTRACT**

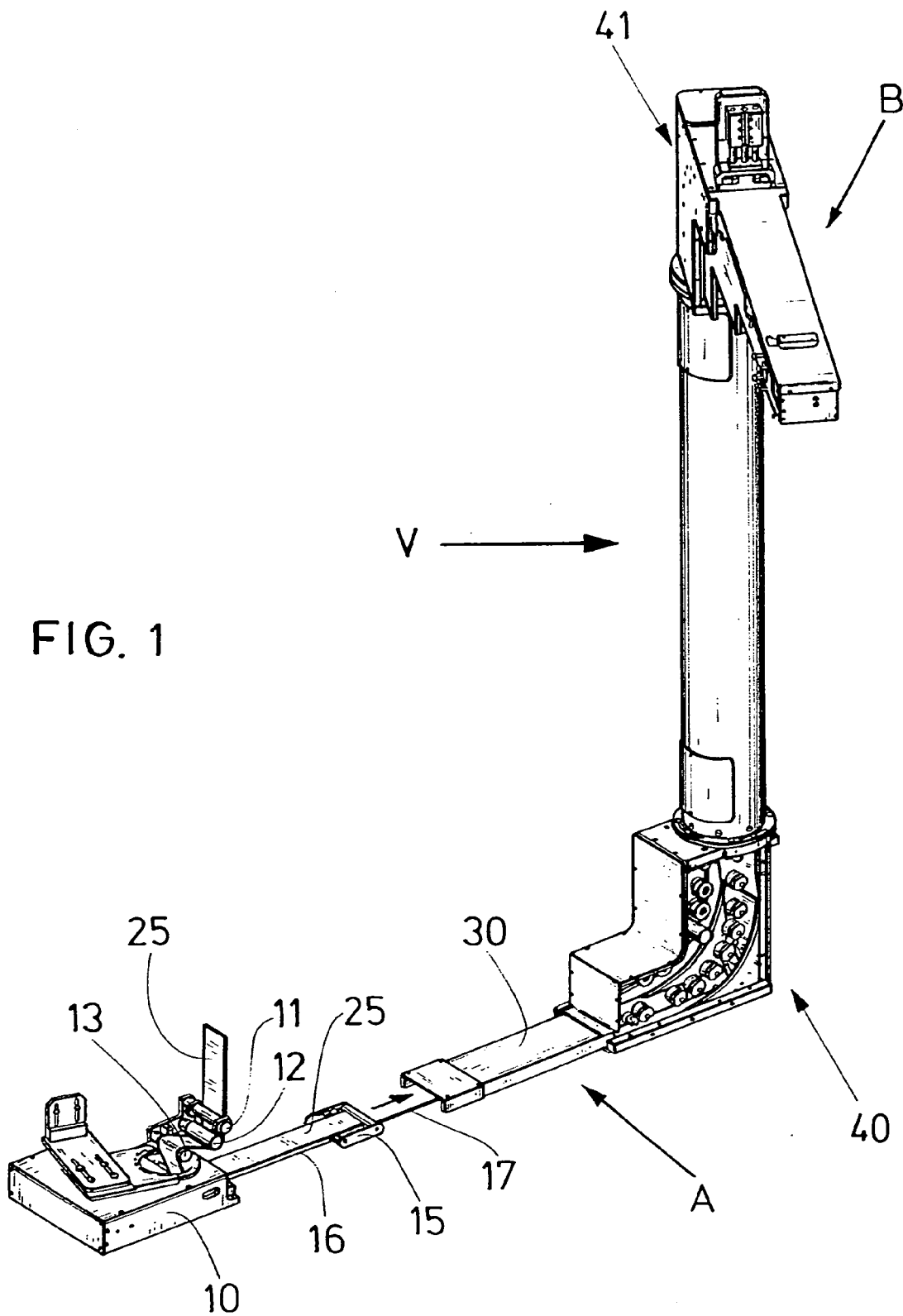
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A device for transporting a wrapping-paper web in the tobacco industry includes a transport channel in which the wrapping-paper web is transported; and a conveying slide arranged for movement inside the transport channel for transporting the wrapping-paper web in the transport channel.

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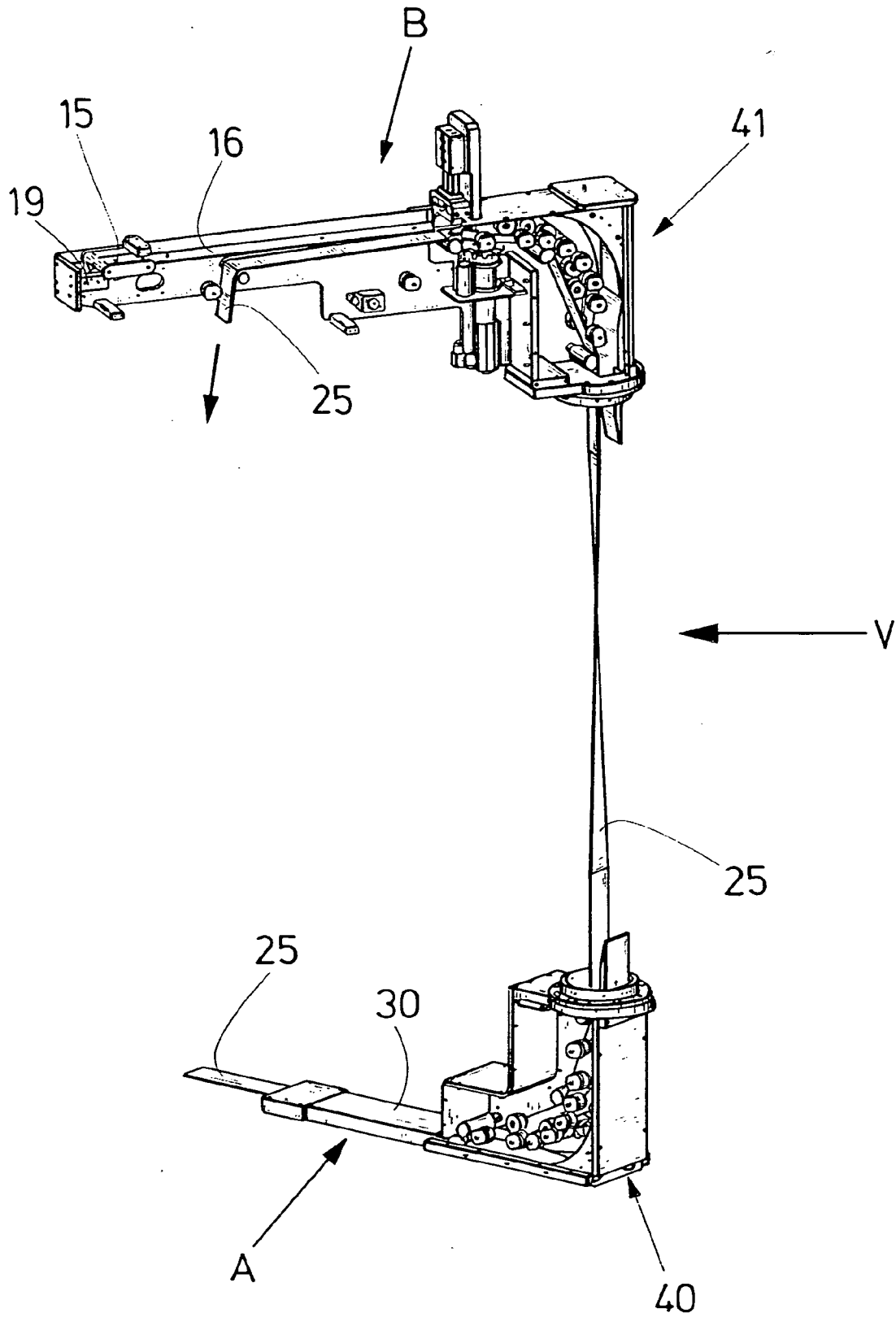


FIG. 2

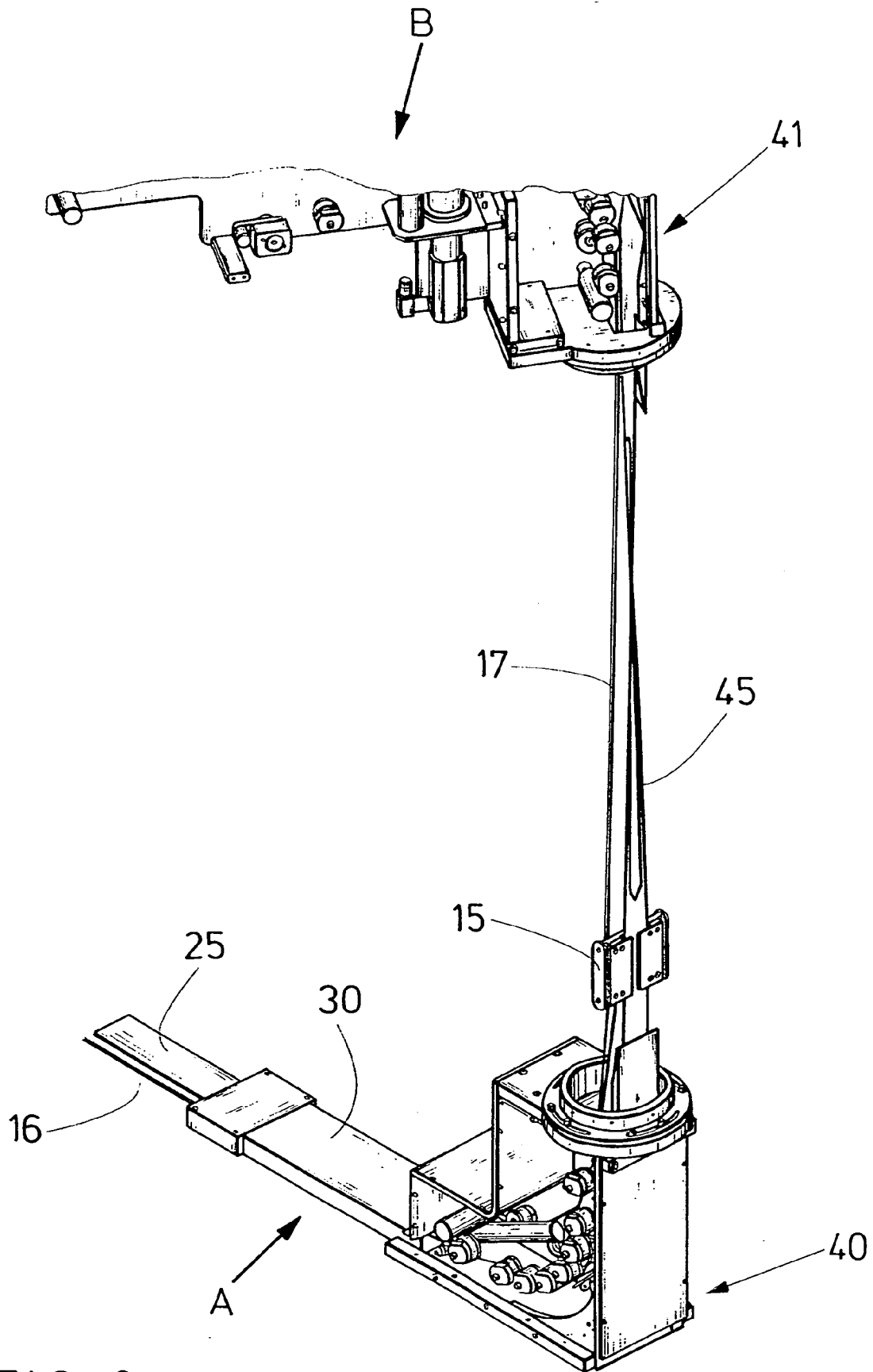


FIG. 3

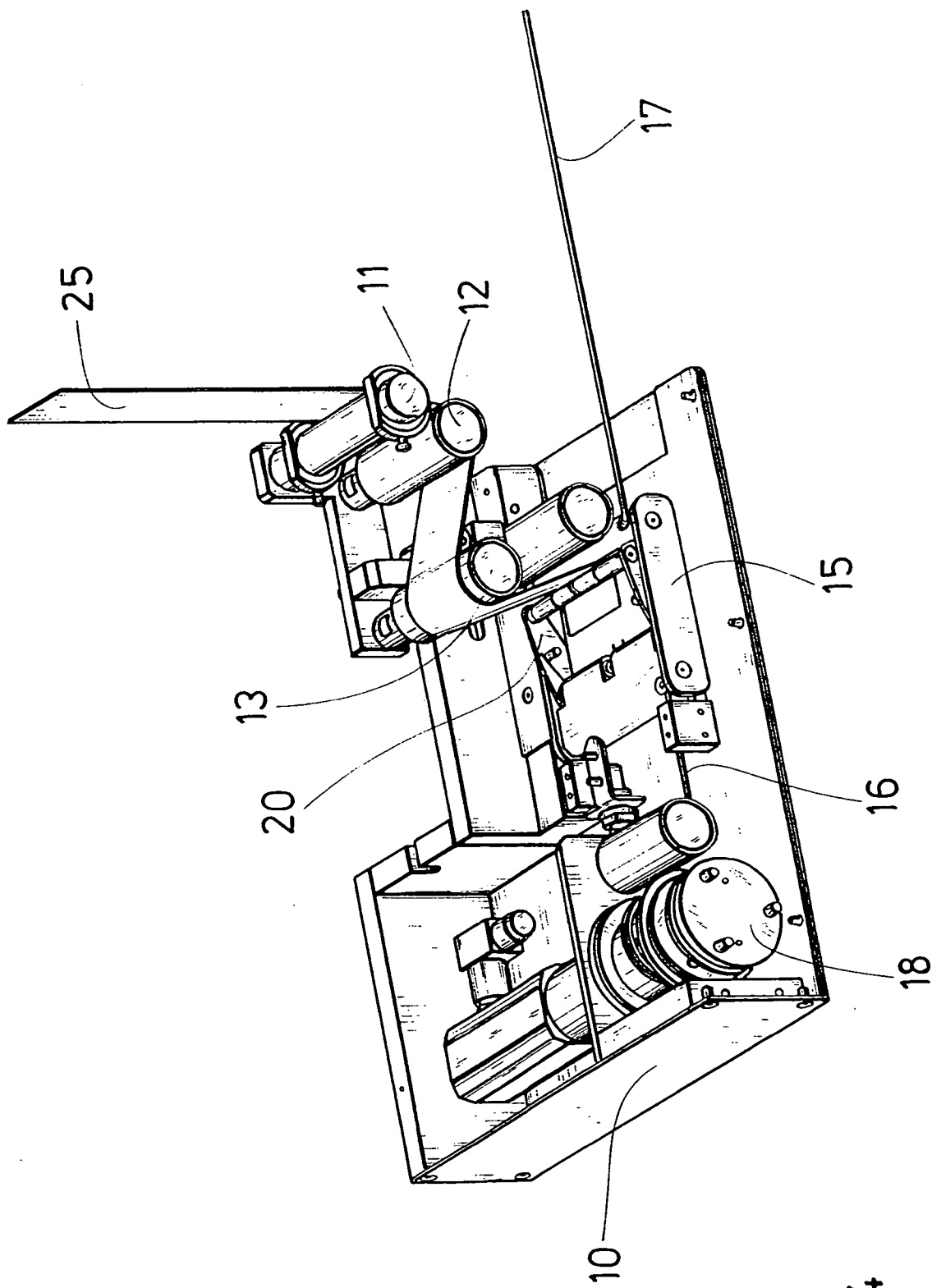


FIG. 4

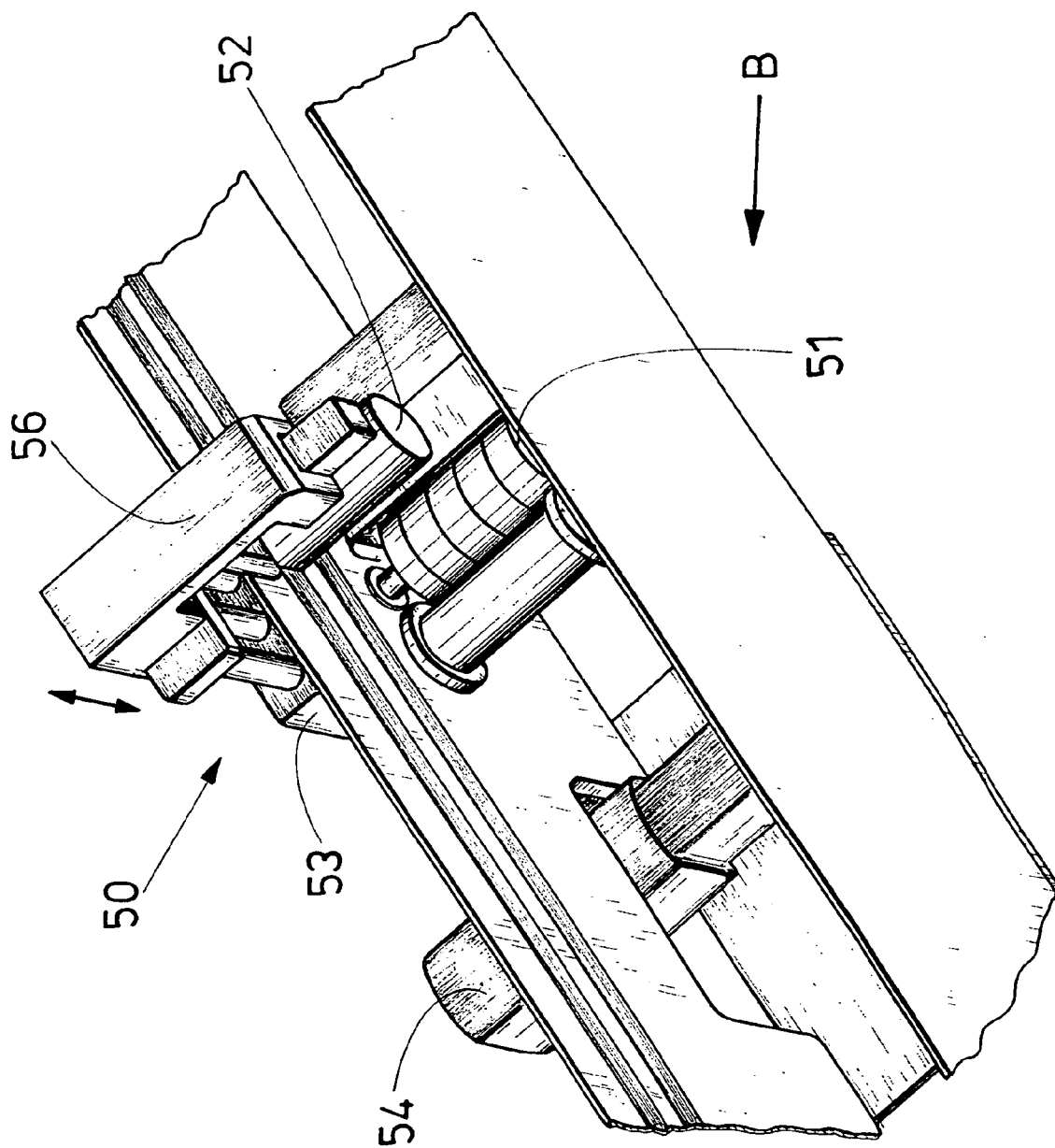


FIG. 5

TRANSPORT OF A WRAPPING-PAPER WEB IN THE TOBACCO INDUSTRY

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority of German Patent Application No. 103 61 171.1, filed on Dec. 22, 2003, the disclosure of which, together with the disclosures of each and every U.S. foreign patent and patent application mentioned herein, is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The invention relates to a transport device for a wrapping-paper web in the tobacco industry, comprising a transport channel for a wrapping-paper web. The invention furthermore relates to a method of transporting a wrapping-paper web in a machine in the tobacco industry, in particular a continuous-rod machine or a filter tipping machine.

[0003] In the tobacco industry, wrapping-paper webs are pulled from bobbins and transported to a forming belt, wherein the wrapping-paper web is wrapped around a tobacco rod transported by the forming belt.

[0004] German patent document DE-A-199 28 867 discloses a device in the tobacco industry for transporting a wrapping material web that is pulled from a bobbin. In addition, German patent document DE-C-34 41 872 discloses a bobbin-changing unit for machines in the tobacco industry, wherein the bobbin changing unit is connected via a web conveying belt to a continuous cigarette-rod machine. A bobbin changing unit of this type is provided with two bobbin mountings, one for an unwinding bobbin and one for a new bobbin, as well as a storage magazine for new bobbins and a device for transferring a new bobbin from the storage magazine to the bobbin mountings.

[0005] The bobbin storage device and the bobbin changing device are designed for all bobbins generally used in the tobacco industry, meaning for bobbins holding cigarette paper, mouthpiece tipping paper, filter-tipping paper or similar materials. One preferred area of use for the bobbin changing devices and the bobbin storage devices are continuous-rod machines, e.g. cigarette-rod or filter-rod machines. As a result of the high production capacity of modern continuous-rod machines, a bobbin change is required quite frequently and must be carried out within a very short time. To meet these requirements, the bobbin changing operation was automated and adapted to the continuous-rod machines, which for the most part run automatically.

[0006] As is known, a bobbin changing unit must also be set up spatially separated from a machine in the tobacco industry, wherein the wrapping-paper web pulled from a bobbin is transported through transport channels to this machine.

SUMMARY OF THE INVENTION

[0007] It is an object of the present invention to modify a machine used in the tobacco industry, wherein the wrapping-material web pulled from a bobbin is transported over a longer distance to the machine in the tobacco industry.

[0008] The above and other objects are achieved according to the invention by the provision of a device for

transporting a wrapping-paper web in the tobacco industry, comprising: a transport channel in which the wrapping-paper web is transported; and a conveying slide arranged for movement inside the transport channel for transporting the wrapping-paper web.

[0009] The conveying slide according to the invention thus represents a transport device for conveying a wrapping-paper web that is pulled off a bobbin to a machine in the tobacco industry. The transport channel in this case can have a closed design for an in-ground installation, thus making it possible on the whole to have a level ground, which furthermore avoids damage to the wrapping-paper web conveyed inside this closed transport channel.

[0010] At least one drive is provided for moving the conveying slide inside the transport channel.

[0011] A drive is realized by moving the conveying slide with the aid of at least one traction rope inside the transport channel.

[0012] The conveying slide can be moved and guided precisely with the aid of two traction rope winches, wherein the conveying slide is arranged between the traction rope winches so that it can move back and forth inside the transport channel.

[0013] The conveying slide is provided with a clamping device for clamping in the wrapping-paper web, such that the wrapping-paper web can be taken over at the bobbin changing unit and can be transported safely through the transport channel.

[0014] According to one exemplary embodiment of the invention, the clamping device opens up automatically during the transfer, in particular for receiving and/or releasing the wrapping-paper web. The clamping device in this case is designed such that the conveying slide can be moved to a receiving position, thus causing the clamping device to be released and wrapping-paper web to be inserted. Subsequently, the conveying slide is moved out of the receiving position, such that the clamping device can close, and the conveying slide together with the clamped-in end of the wrapping-paper web is guided through the transport channel to a discharge position. In the discharge position, the clamping device is released again to allow the clamped-in end of the conveyed wrapping-paper web to be gripped by the operating personnel or a working tool and to be supplied to a machine in the tobacco industry for further processing.

[0015] It is furthermore advantageous if the conveying slide can be moved back and forth between a position for receiving the wrapping-paper web and a position for releasing the wrapping-paper web. Within the framework of this invention, the conveying slide can be conveyed back to the starting position, meaning the receiving position, following the release and/or transfer of the wrapping-paper web end.

[0016] For a reliable transfer of the wrapping-paper web to the conveying slide, a threading device is advantageously provided for transferring the wrapping-paper web to the clamping device on the conveying slide.

[0017] According to another exemplary embodiment, at least one guiding device is provided for the conveying slide, so that the conveying slide is guided at least in some sections of the transport channel and the wrapping-paper web is reliably guided inside the transport channel. For this, the

transport channel, in particular, is designed at least in some sections as a guiding device for the conveying slide.

[0018] If the slide has an essentially rectangular cross-sectional shape, then the conveying slide can be guided with the aid of a rectangular inside contour of the channel. That is to say, the transport channel is designed to complement the conveying slide in form and function, thus resulting in a precise guidance of the conveying slide in specific sections of the transport channel.

[0019] It is furthermore provided that the transport channel is designed at least partially as a guide channel for the conveying slide.

[0020] According to yet another preferred embodiment of the invention, a guide rail is provided for guiding the conveying slide in at least some sections, such that a conveying slide with rectangular cross section, for example, is precisely guided through a transport channel section with round cross section without hitting the inside walls of the round transport channel.

[0021] It is furthermore advantageous if the guide rail itself is or can be twisted, so that the wrapping-paper web will be twisted during the transport in a specific region of the transport channel.

[0022] At least one deflection device is furthermore provided for the conveying slide to move the conveying slide and the wrapping-paper web from a vertical transport channel section to a horizontal transport channel section or vice versa, wherein the deflection device is preferably provided with guide rollers to achieve this movement.

[0023] According to an advantageous modification of the invention, a transfer-holding device for the wrapping-paper web is provided for holding the wrapping-paper web during the release. This avoids a pullback or return movement of the wrapping-paper web through the transporting device during the release of the wrapping-paper web to a working tool or a conveying element of a machine for further processing. The transfer holding device on the one hand prevents the wrapping-paper web from executing a backward movement and, at the same time, making it available for further processing. The transfer holding device is preferably made operational only after the wrapping-paper, following its transport through the transport channel, is released from the clamping device. As a result, the discharge to a different machine is improved.

[0024] It is advantageous in this connection if the transfer holding device is provided with at least one roller pair.

[0025] A drive for one of the rollers of the roller pair may also be provided to move the wrapping-paper web to a release position.

[0026] Once the wrapping-paper web has been transferred to a machine in the tobacco industry, it is no longer necessary for the rollers of the roller pair to make contact. To advantageously distance the rollers, a lifting drive may be provided for one roller of the roller pair, thus making it possible for the conveying slide to be returned to its starting position.

[0027] According to another aspect of the invention, there is provided a method for transporting a wrapping-paper web in a machine in the tobacco industry, in particular a con-

tinuous cigarette-rod machine or filter tipping machine, the method comprising utilizing the above-described device for transporting the wrapping-paper web, that is to say, utilizing a device comprising a transport channel and a conveying slide arranged inside the transport channel for transporting the wrapping-paper web.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The invention is explained in the following with the aid of the exemplary embodiment shown in the drawings and described without restricting the general inventive idea, wherein for all inventive details not described further in the text reference is made to the drawings.

[0029] FIGS. 1 to 3 show separate perspective views of a transport device for a wrapping-paper web according to the invention, as seen from different viewing angles.

[0030] FIG. 4 is a detailed view of a conveying slide during the transfer of the wrapping-paper web, according to the invention.

[0031] FIG. 5 is a perspective view of a transfer holding device according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0032] The same or the same type of elements or respective parts are provided with the same reference numbers in the following Figures and will not be introduced again.

[0033] FIGS. 1 to 3 show different views of a transporting device for a wrapping-paper web 25. The wrapping-paper web 25 is pulled from a bobbin (not shown herein) which is arranged in an automatic bobbin machine. The wrapping-paper web 25 is transported via several rollers 11, 12, 13 to a threading device 10, which is better shown in the enlarged view of FIG. 4. Following the threading of the wrapping-paper web 25 into a conveying slide 15 (compare FIG. 4), the slide 15 is moved and guided through various sections of the transport device with the aid of two traction ropes 16, 17 that are attached to the conveying slide 15.

[0034] As shown in FIGS. 1-3, the transport device for the exemplary embodiment is provided with two horizontal transporting sections A and B, and a vertical transporting section V in-between.

[0035] The horizontal transporting section A includes a transport channel 30 with rectangular cross section, designed for the conveying slide 15. According to the invention, the geometric dimensions of transport channel 30 on the inside essentially correspond to the outer dimensions of the conveying slide 15, so that the conveying slide 15 is guided in the transporting section A as on a rail.

[0036] A deflection device 40 is provided to transfer the conveying slide 15 from the horizontal transporting section A to the vertical transporting section V. In addition, a further deflection device 41 is provided to subsequently transfer the slide from the vertical transporting section V to the upper horizontal transporting section B.

[0037] For the exemplary embodiment shown in FIGS. 1 to 3, the horizontal transporting section A and the horizontal transporting section B are arranged at an angle relative to each other, so that the wrapping-paper web 25 twists and/or

is twisted in the region of the vertical transporting section V. This situation is shown in **FIG. 2**, wherein some elements are not shown for reasons of clarity.

[0038] The deflection devices **40**, **41** are provided with guide rollers for the conveying slide **15**, wherein the traction ropes **16**, **17** are guided by guide grooves in the rollers of the deflections devices **40**, **41**.

[0039] **FIG. 3** shows a guide rail **45** with a twisted section arranged between the lower deflection device **40** and the upper deflection device **41** for guiding the conveying slide **15** in the region of the vertical transporting section V.

[0040] Following the transfer of the wrapping-paper web **25** from the vertical transporting section V to the horizontal transporting section B, the clamped-in wrapping-paper web **25** on the conveying slide **15** is released at the end of the transporting section B. A traction rope winch **19** is arranged at the end of transporting section B, around which the traction rope **17** is wound completely, wherein a traction rope winch **18** is also provided at the start of transporting section A for the traction rope **16**.

[0041] Since the drive for both traction rope winches **18** and **19** is synchronized, the conveying slide **15** is moved back and forth over the transporting sections A, V and B. Once the wrapping-paper web **25** is released from the clamping in the upper horizontal transporting section B, the wrapping-paper web is conveyed for further processing via additional conveying elements to a machine in the tobacco industry, e.g. a continuous cigarette-rod machine.

[0042] Within the framework of this invention, the conveying slide **15** can move back to its starting position (**FIG. 4**) once the wrapping-paper web **25** has been released while the wrapping-paper web **25** is conveyed in the opposite direction.

[0043] **FIG. 4** contains a detailed view of the threading device **10**. The conveying slide **15** is provided with a spring-loaded clamping device with clamping yoke **20**. For the position where the wrapping-paper web **25** is received, the clamping yoke **20** is detached from the conveying slide **15**, so that the end of the wrapping-paper web **25** is clamped in between the clamping yoke **20** and the conveying slide **15**.

[0044] Once the wrapping-paper web **25** has been threaded in, the conveying slide **15** is pulled with the traction ropes **16**, **17** through the transport channel **30** (**FIG. 1**). Subsequently, the conveying slide **15** together with the clamped-in wrapping-paper web **25** is moved through the deflection device **40**, the vertical transporting section V, as well as the additional deflection device **41** into the horizontal upper transporting section B.

[0045] **FIG. 5** shows a portion of the horizontal transporting section B, wherein the transporting section B is reversed for a better view. In the conveying direction of the wrapping-paper web in the horizontal transporting section B, a transfer holding device **50** is provided in front of the traction rope winch (compare **FIG. 2**; reference number **19**). The transfer holding device **50** is activated once the wrapping-paper web is removed from the conveying slide by releasing the clamping device in the conveying slide.

[0046] The transfer holding device **50** consists of a roller pair with a lower roller **51** and an upper roller **52** that rotates along, wherein the roller **51** is driven by a motor **54**. To

clamp the wrapping-paper web between the roller **51** and the roller **52**, the roller **52** which is arranged on a holder **56** executes a linear movement in a transverse direction, especially perpendicular, to the movement direction of the wrapping-paper web by means of a lifting drive **53**, until the wrapping-paper web is fitted between the rollers **51** and **52**, so as to make contact.

[0047] The rollers **51**, **52** are brought together once the conveying slide has pulled the wrapping-paper web through the channel of the horizontal transporting section B, before the clamping of the wrapping-paper web is released. As a result of clamping in the wrapping-paper web between the rollers **51**, **52**, the wrapping-paper web is prevented from sliding back. The clamped-in wrapping-paper web is advanced by means of the driven rollers **51** until the wrapping-paper web is gripped by a different working element, for example a different processing machine in the tobacco industry. Subsequently, the rollers **51**, **52** are moved apart by activating the linear drive **53**, so that the conveying slide can be moved back between the rollers **51**, **52** to its starting position at the lower end of transporting section A (compare **FIG. 1**, **FIG. 4**).

[0048] The invention has been described in detail with respect to exemplary embodiments, and it will now be apparent from the foregoing to those skilled in the art, that changes and modifications may be made without departing from the invention in its broader aspects, and the invention, therefore, as defined in the appended claims, is intended to cover all such changes and modifications that fall within the true spirit of the invention.

What is claimed is:

1. A device for transporting a wrapping-paper web in the tobacco industry, comprising:

a transport channel in which the wrapping-paper web is transported; and

a conveying slide arranged for movement inside the transport channel for transporting the wrapping-paper web in the transport channel.

2. The device according to claim 1, further including at least one drive operatively connected with the conveying slide.

3. The device according to claim 2, wherein the at least one drive includes at least one traction rope connected to the conveying slide to move the conveying slide inside the transport channel.

4. The device according to claim 2, wherein the at least one drive includes two traction rope winches operatively arranged to move the conveying slide.

5. The device according to claim 1, wherein the conveying slide includes a clamping device for clamping the wrapping-paper web.

6. The device according to claim 5, wherein the clamping device automatically opens up during at least one of receiving or releasing the wrapping-paper web.

7. The device according to claim 1, wherein the conveying slide can move between a position for receiving the wrapping-paper web and a position for releasing the wrapping-paper web.

8. The device according to claim 1, further including a threading device arranged to transfer the wrapping-paper web to the clamping device.

9. The device according to claim 1, further including at least one guiding device arranged to guide the conveying slide.

10. The device according to claim 1, wherein the transport channel includes at least one section forming a guiding device for guiding the conveying slide.

11. The device according to claim 1, wherein the transport channel is arranged to complement form and function of the conveying slide.

12. The devices according to claim 1, wherein the transport channel is formed at least in part as a guide channel for the conveying slide.

13. The device according to claim 1, further including a guide rail at least in some sections of the transport channel for guiding the conveying slide.

14. The device according to claim 13, wherein the guide rail is twisted.

15. The device according to claim 1, further including at least one deflection device operatively arranged for deflecting the conveying slide along the transport channel.

16. The device according to claim 15, wherein the deflection device includes a roller guide.

17. The device according to claim 1, further including a transfer holding device arranged for releasing the wrapping-paper web.

18. The device according to claim 17, wherein the transfer holding device comprises at least one roller pair.

19. The device according to claim 18, further including a drive for one roller of the roller pair.

20. The devices according to claim 18, wherein the drive comprises a lifting drive.

21. A method for transporting a wrapping-paper web in a machine in the tobacco industry, comprising utilizing a device for transporting the wrapping-paper web in the tobacco industry as defined in claim 1.

* * * * *