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(54) **DEVICE FOR WINDING A WEB, IN PARTICULAR A REWINDER**

VORRICHTUNG ZUR BAHNWICKLUNG, IM BESONDEREN EIN AUFWICKLER

DISPOSITIF D'ENROULEMENT D'UNE BANDE, EN PARTICULIER DE TYPE ENROULEUR

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**US-A1- 2003 201 361** **US-B1- 6 820 834**

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## Description

**[0001]** The invention relates to a device according to the preamble of claim 1.

**[0002]** In the prior art, so-called rewinders (clinic roller, salvage winder, rewinder) are known which are used for the slitting and rewinding of web rolls run on a slitter-winder, wound about a core, and comprising possible defects or the like. The rewinder comprises an unwind section, a slitter section and a windup section. The web roll is unwound on the unwind section, and the web is passed to the slitter section, in which the web is cut into component webs in the longitudinal direction and possible poor-quality edge parts, i.e. edge trim strips, are cut out of the web. From the slitter section the web is guided to the windup section, in which the component webs are wound about cores to form rolls.

**[0003]** In the prior-art unwind sections of rewinders, the core of the web roll is attached to core chucks for unwinding and, correspondingly, in the windup section the rolls are held in place by means of core chucks, whose chucks are inserted into the outermost cores. The width of rewound rolls varies considerably, typically between 0.5 and 4.3 m, which imposes high demands on core chucks. Typically, core chucks are fixed to side frames. The core chuck structure is typically telescopic, comprising a two-phase operation. In addition, extension pieces have also often been used in connection with core chuck structures if the roll to be wound has been narrow, for example, having a width of 500 mm. The use of this kind of extension pieces is laborious because their attachment and detachment takes time. Furthermore, the movable arm of the core chuck or the movable arms in a telescope model, the chuck and the possible extension pieces must be smaller in diameter than the outside diameter of the smallest core in order that the structures shall not touch winding drums at the beginning of winding. Therefore, it has been problematic to achieve sufficient stiffness. The space requirement of the structure has also proved problematic.

**[0004]** In the prior art, a two-drum type windup section of a rewinder is known in which component web rolls are wound on support of winding drums by means of a winding nip defined between the growing web roll and one of the drums. In the two-drum type windup section, one winding drum can comprise a set of belt drums in which an endless belt loop is disposed about two drums. In this description, by the term 'winding drum' is meant, in addition to a conventional winding drum, a winding drum formed of a set of belt drums. In winding it is also possible to use a rider roll unit to hold the web rolls in place and to provide an additional load. The rider roll unit has been typically formed of several rider rolls that are separately loadable, i.e. each rider roll of the rider roll unit has its own loading devices. The windup section of the rewinder may also have been a centre-driven winder, in which the web roll being wound up is rotated at the centre, and the winding takes place in a separate winding station by

means of a nip defined between the web roll and a winding cylinder. These are, however, complicated in structure and expensive and typically comprise several winding stations because each roll has required a separate station if the web has been slit into several component webs, and thus demand lot of space.

**[0005]** Document EP 0 962 411 A1 discloses a rewinder comprising a pair of lower winding rolls defining a winding cradle, which are movable from an upper position toward a lower position during the winding of a reel, in order to keep the axis of the developing reel in an essentially fixed position.

**[0006]** An object of the invention is to provide a device in which the above-noted drawbacks associated with rewinders are eliminated or at least minimized.

**[0007]** A particular object of the invention is to create a rewinder that is suitable for use in a wide width range but which is of low cost.

**[0008]** With a view to achieving the objectives described above as well as those coming out later, the device according to the invention is mainly characterized by what is stated in the characterizing part of claim 1.

**[0009]** The dependent claims disclose additional features of advantageous embodiments of the invention.

**[0010]** The device in accordance with the invention for winding a web, in particular rewinding, operates in a wide width range, advantageously with 0.5 - 5.3 m wide rolls, and it is simple in construction and of low cost as well as small in respect of its space requirement.

**[0011]** In accordance with an advantageous embodiment of the invention, the winding station is arranged on a rider roll beam. The winding station can also be arranged on another suitable crossbeam already existing in the windup section, for example, on one crossbeam of the ejector, on a gap protection means or on another fixed crossbeam of the windup section. The winding carriages of the winding station are arranged to be movable in the transverse and vertical direction such that the winding heads can be placed on core ends. Separate actuators are advantageously arranged for the transverse and vertical movements of the winding station, and both force and position measurement is integrated with said actuators in accordance with an advantageous additional feature of the invention.

**[0012]** In accordance with one advantageous additional feature of the invention, small-diameter rolls are used as winding drums and as a rider roll: the winding drums 500-800 mm and the rider roll 100-300 mm, thus allowing the space needed for the structures of the winding station to be readily arranged. The diameters of the winding drums and the rider roll are optimized such that the path of movement of the rider roll with respect to the centre of the core produces, when using a core of 76,2 mm (3 inches), a gap which remains on one side and which is larger than 10 mm, preferably 15 mm. This makes it possible for the winding station to be readily brought to its place.

**[0013]** Because of the winding station, the invention

makes it possible to construct rewinders that are wider than those known in the state of the art.

**[0014]** In the following, the invention will be described in greater detail with reference to the figures in the appended drawing, to the details of which the invention is, however, by no means meant to be narrowly limited.

**[0015]** Figure 1 schematically shows one embodiment of the device in accordance with the invention.

**[0016]** Figure 2 schematically shows one embodiment of the device in accordance with the invention at the initial stage of winding.

**[0017]** Figure 3 schematically shows the embodiment shown in Fig. 2 at the final stage of winding.

**[0018]** Figure 4 is a schematic view of an embodiment in which a winding station is attached to a gap protection means.

**[0019]** Figure 5 is a schematic view of an embodiment in which a winding station is attached to a fixed cross-beam of a windup section.

**[0020]** Figure 6 shows a schematic dimensioning example for optimizing the diameters of winding drums and a rider roll.

**[0021]** In the following Figs. 1-5, the same reference signs are used of the parts corresponding to one another, unless otherwise stated. The main parts of a rewriter are an unwind section, a slit section and a windup section 10, in which a web roll wound about a core on a slit-winder is unwound, slit and rewound. The windup section 10 comprises a front drum 12, a rear drum 11, a rider roll 16, and a winding station 20 as well as a rider roll beam 17. The winding station 20 comprises two winding carriages 21 and winding heads 23, one for each end of the core. By means of the winding station 20, the core/cores and the web roll/web rolls are held in place in the lateral direction during winding. The winding carriage 21 comprises a frame, actuators, and the winding head 23 is attached to it.

Fig. 1 is a schematic view of one embodiment of the invention for a device in winding of a web, in particular a windup section of a rewriter. The windup section 10 of the rewriter shown in the figure is a two-drum type winder, and it comprises a rear drum, i.e. a rear winding drum 11, and a front drum, i.e. a front winding drum 12, which in the embodiment of the figure is formed into a set of belt drums, in which there are two drums 13, 14 and an endless belt loop 15 disposed about them. A web roll (not shown) is wound on support and by means of the winding drums 11, 12. The windup section 10 also comprises a rider roll 16, by which the web roll is supported and, when needed, loaded during winding. The rider roll 16 is fixed to a rider roll beam 17, which is in turn supported on frame structures 18 of the winder. The rider roll 16 extends substantially across the entire width of the windup section in accordance with the invention, and only one actuator is needed in it for loading. In accordance with the invention, the windup

section 10 comprises a winding station 20. The winding carriage 21 of the winding station is attached movably onto guides 22 arranged on the rider roll beam 17. The winding head 23 of the winding station 20 is attached to the end of the core of the web roll for the duration of winding. Fig. 1 shows only one winding carriage 21 of the winding station and the winding head 23 arranged for that. Of course, the winding station 20 also comprises a winding head and its winding carriage arranged in connection with the other end of the web roll. For transverse and vertical movement of the winding station 20, the winding station comprises actuators (not shown). At least one web roll is attached between the winding heads 23 of the winding station 20, but there can be several web rolls side by side, in which case the winding heads 23 are attached to the ends of the cores of the outermost web rolls. The winding head 23 comprises means known in themselves for placement at the end of the core and for attachment thereto, for example, a chuck and a slide as well as an actuator for loading the chucks during winding.

Fig. 2 is a schematic view of a windup section 10 in accordance with one embodiment of the invention at the initial stage. A core placed in the winding station 20 has been brought onto support of a front winding drum 11 and a rear winding drum 12 of the two-drum type windup section 10, which core is supported by means of a rider roll 16, and the winding of the web about the core is about to be started. As shown in the figure, the winding head 23 of the winding station 20 is attached to a winding carriage 21, which is arranged to be movable in the lateral direction on guides of a rider roll beam 17 and in the vertical direction on guides 26 provided on an intermediate part 25.

Fig. 3 is a schematic view of the embodiment shown in Fig. 2 at the final stage of winding when a web roll 30 is at the completion stage. As shown in the figure, the web roll is still coupled to the winding station 20, from which it is detached upon completion of the web roll 30.

Fig. 4 is a schematic view of an embodiment in which a winding station 20 is attached to a gap protection means 27.

Fig. 5 is a schematic view of an embodiment in which a winding station 20 is attached to a fixed crossbeam 28 of a windup section 10.

Fig. 6 shows a schematic dimensioning example for optimizing the diameters of the winding drums and the rider roll. In the example, small-diameter rolls are used as the winding drums and as the rider roll: the winding drums 500-800 mm and the rider roll

100-300 mm, thus allowing the space needed for the structures of the winding station to be readily arranged. The diameters d11, d12, d16 of the winding drums 11, 12 and the rider roll 16 are optimized such that the path of movement of the rider roll 16 with respect to the centre of the core 23 produces, when using a core of 76,2 mm (3 inches), a gap z which remains on one side and which is larger than 10 mm, preferably 15 mm.

[0022] Above, the invention has been described only with reference to one exemplifying embodiment thereof, but the invention is by no means meant to be narrowly limited to the details of said embodiment.

### Claims

1. A device for winding a web, in particular a rewinder, comprising an unwind section, a slitter section and a windup section (10), wherein the windup section (10) is a two-drum type winder and comprises two winding drums (11, 12) and one winding station (20), said windup section (10) comprising a rider roll (16) extending substantially across the entire width of the windup section,  
**characterized in that**  
the winding station (20) of the windup section (10) comprises winding carriages (21) which are movable in a lateral direction parallel to the axis of said rider roll (16) and in the vertical direction by means of an actuator, said winding station (20) further comprises winding heads (23).
2. A device as claimed in claim 1, **characterized in that** the diameters (d11, d12, d16) of said winding drums (11, 12) and said rider roll (16) of the windup section (10) are optimized such that the path of movement of the rider roll (16) with respect to the centre of a core (23) produces a gap (z) between one winding drum (11) and the rider roll (16), that is larger than 10 mm.
3. A device as claimed in claim 1 or 2, **characterized in that** an actuator is arranged in connection with the rider roll (16) to load it.
4. A device as claimed in any one of the preceding claims, **characterized in that** the windup section (10) is arranged to operate in a roll width range of 0.5 - 5.3 m of the roll to be wound.
5. A device as claimed in any one of the preceding claims, **characterized in that** force and position measurement is integrated with the actuators producing the transverse and vertical movements of the winding carriage (21) of the windup section (10).

6. A device as claimed in any one of the preceding claims, **characterized in that** the winding station (20) of the windup section (10) is arranged on a rider roll beam (17).
7. A device as claimed in any one of the claims 1 to 5, **characterized in that** the winding station (20) of the windup section (10) is attached to a crossbeam of an ejector.
8. A device as claimed in any one of the claims 1 to 5, **characterized in that** the winding station (20) of the windup section (10) is attached to a gap protection means (27).
9. A device as claimed in any one of the claims 1 to 5, **characterized in that** the winding station (20) of the windup section (10) is attached to a fixed crossbeam of the windup section.

### Patentansprüche

1. Vorrichtung zum Wickeln einer Bahn, insbesondere ein Umwickler, die eine Abwickelsektion, eine Schneidsektion und eine Aufwickelsektion (10) aufweist, wobei die Aufwickelsektion (10) ein Wickler der Art mit zwei Trommel ist und zwei Wickeltrommeln (11, 12) und eine Wickelstation (20) aufweist, wobei die Aufwickelsektion (10) eine Reiterrolle (16) aufweist, die sich im Wesentlichen über die gesamte Breite der Aufwickelsektion erstreckt,  
**dadurch gekennzeichnet, dass**  
die Wickelstation (20) der Aufwickelsektion (10) Wickelschlitten (21) aufweist, die in einer seitlichen Richtung parallel zu der Achse der Reiterrolle (16) und in der vertikalen Richtung mittels eines Aktuators beweglich sind, wobei die Wickelstation (20) des Weiteren Wickelköpfe (23) aufweist.
2. Vorrichtung gemäß Anspruch 1,  
**dadurch gekennzeichnet, dass**  
die Durchmesser (d11, d12, d16) der Wickeltrommeln (11, 12) und der Reiterrolle (16) der Aufwickelsektion (10) derart optimiert sind, dass die Bewegungsbahn der Reiterrolle (16) in Bezug auf die Mitte eines Kerns (23) einen Spalt (z) zwischen einer Wickeltrommel (11) und der Reiterrolle (16) erzeugt, der größer als 10 mm ist.
3. Vorrichtung gemäß Anspruch 1 oder 2,  
**dadurch gekennzeichnet, dass**  
ein Aktuator in Verbindung mit der Reiterrolle (16) angeordnet ist, um diese zu belasten.
4. Vorrichtung gemäß einem der vorherigen Ansprüche,  
**dadurch gekennzeichnet, dass**

die Aufwickelsektion (10) so eingerichtet ist, dass sie in einem Rollenbreitenbereich von 0,5 - 5,3 m der zu wickelnden Rolle arbeitet.

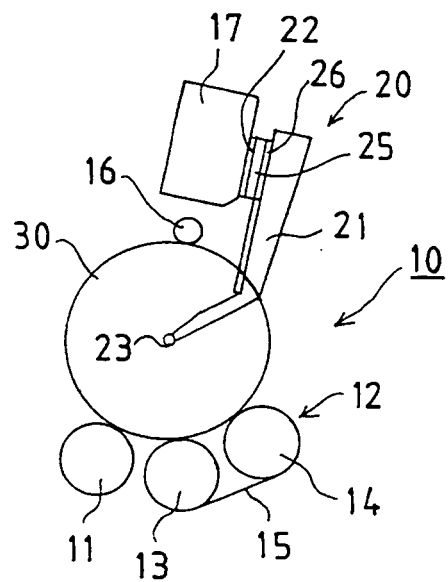
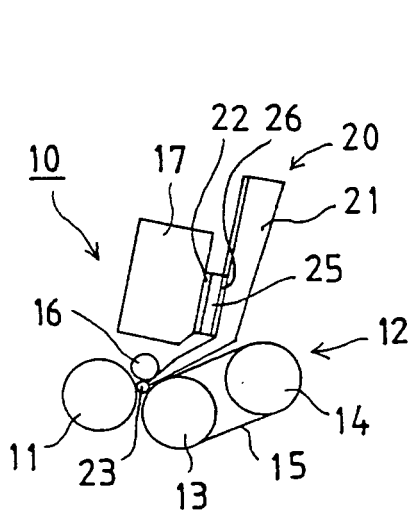
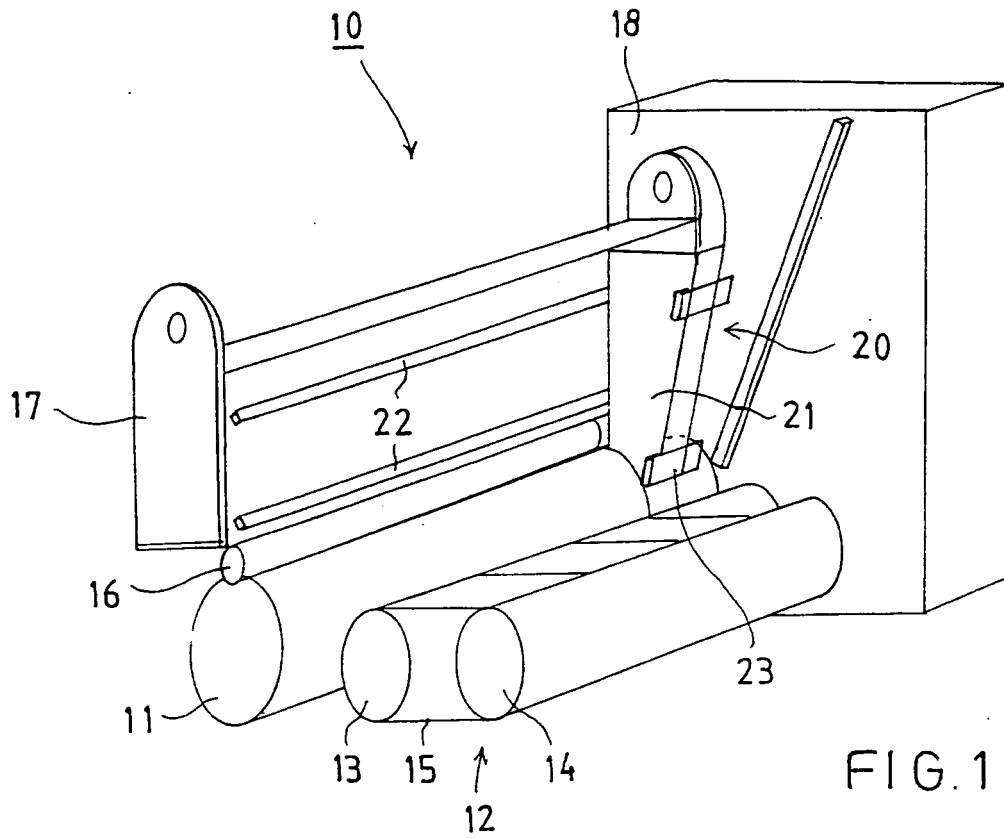
5. Vorrichtung gemäß einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** eine Kraft- und Positionsmessung mit den Aktuatoren, die die Querbewegung und die vertikale Bewegung des Wickelschlittens (21) der Aufwickelsektion (10) erzeugen, integriert ist. 5
6. Vorrichtung gemäß einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** die Wickelstation (20) der Aufwickelsektion (10) an einem Reiterrollenbalken (17) angeordnet ist. 10
7. Vorrichtung gemäß einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Wickelstation (20) der Aufwickelsektion (10) an einem Querbalken eines Ejektors angeordnet ist. 20
8. Vorrichtung gemäß einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Wickelstation (20) der Aufwickelsektion (10) an einer Spaltschutteinrichtung (27) angebracht ist. 25
9. Vorrichtung gemäß einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Wickelstation (20) der Aufwickelsektion (10) an einem fixierten Querbalken der Aufwickelsektion angebracht ist. 30

## Revendications

1. Dispositif pour enrouler une bande, en particulier un enrouleur, comprenant une section de déroulement, une section refendeuse et une section d'enroulement (10), dans lequel la section d'enroulement (10) est un enrouleur du type à deux tambours et comprend deux tambours d'enroulement (11, 12) et une station de bobinage (20), ladite section d'enroulement (10) comprenant un rouleau presseur (16) s'étendant essentiellement sur toute la largeur de la section d'enroulement, **caractérisé en ce que** la station de bobinage (20) de la section d'enroulement (10) comprend des charriots de bobinage (21) qui se déplacent dans une direction latérale parallèle à l'axe dudit rouleau presseur (16) et dans la direction verticale au moyen d'un actionneur, ladite station de bobinage (20) comprend en outre des têtes d'enroulement (23). 40
2. Dispositif tel que revendiqué dans la revendication 1, **caractérisé en ce que** les diamètres (d11, d12, 50

d16) desdits tambours d'enroulement (11, 12) et dudit rouleau presseur (16) de la section d'enroulement (10) sont optimisés de sorte que le chemin de déplacement du rouleau presseur (16) par rapport au centre d'un noyau (23) produise un écartement (z) entre un tambour d'enroulement (11) et le rouleau presseur (16), qui est supérieur à 10 mm.

3. Dispositif tel que revendiqué dans la revendication 1 ou 2, **caractérisé en ce qu'un** actionneur est agencé en rapport avec le rouleau presseur (16) pour le charger. 10
4. Dispositif tel que revendiqué dans l'une quelconque des revendications précédentes, **caractérisé en ce que** la section d'enroulement (10) est agencée de manière à fonctionner dans une gamme de largeur du rouleau de 0,5 - 5,3 m du rouleau à enrouler. 15
5. Dispositif tel que revendiqué dans l'une quelconque des revendications précédentes, **caractérisé en ce que** des mesures de position et de force sont intégrées avec les actionneurs produisant les mouvements vertical et transversal du chariot de bobinage (21) de la section d'enroulement (10). 20
6. Dispositif tel que revendiqué dans l'une quelconque des revendications précédentes, **caractérisé en ce que** la station de bobinage (20) de la section d'enroulement (10) est agencée sur un faisceau (17) de rouleau presseur. 25
7. Dispositif tel que revendiqué dans l'une quelconque des revendications 1 à 5, **caractérisé en ce que** la station de bobinage (20) de la section d'enroulement (10) est fixée à une traverse d'un éjecteur. 30
8. Dispositif tel que revendiqué dans l'une quelconque des revendications 1 à 5, **caractérisé en ce que** la station de bobinage (20) de la section d'enroulement (10) est fixée à un moyen (27) de protection de l'écartement. 35
9. Dispositif tel que revendiqué dans l'une quelconque des revendications 1 à 5, **caractérisé en ce que** la station de bobinage (20) de la section d'enroulement (10) est fixée à une traverse fixe de la section d'enroulement. 40



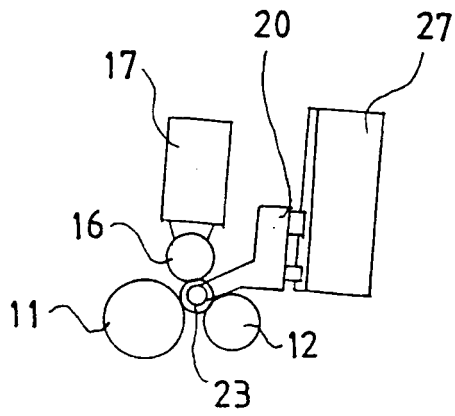


FIG. 4

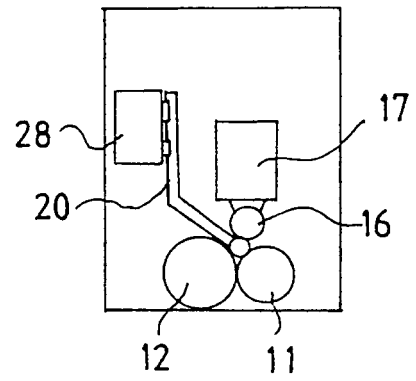


FIG. 5

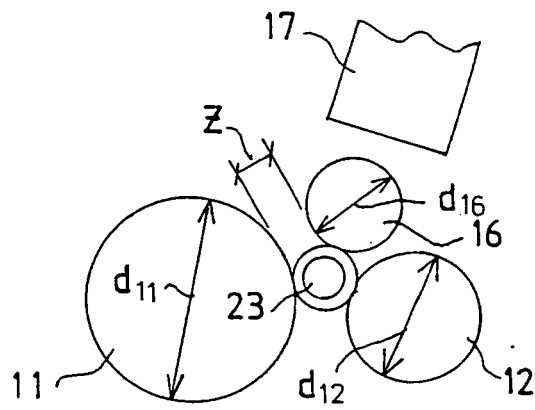


FIG. 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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