

April 7, 1970

E. A. A. ANDERSSON

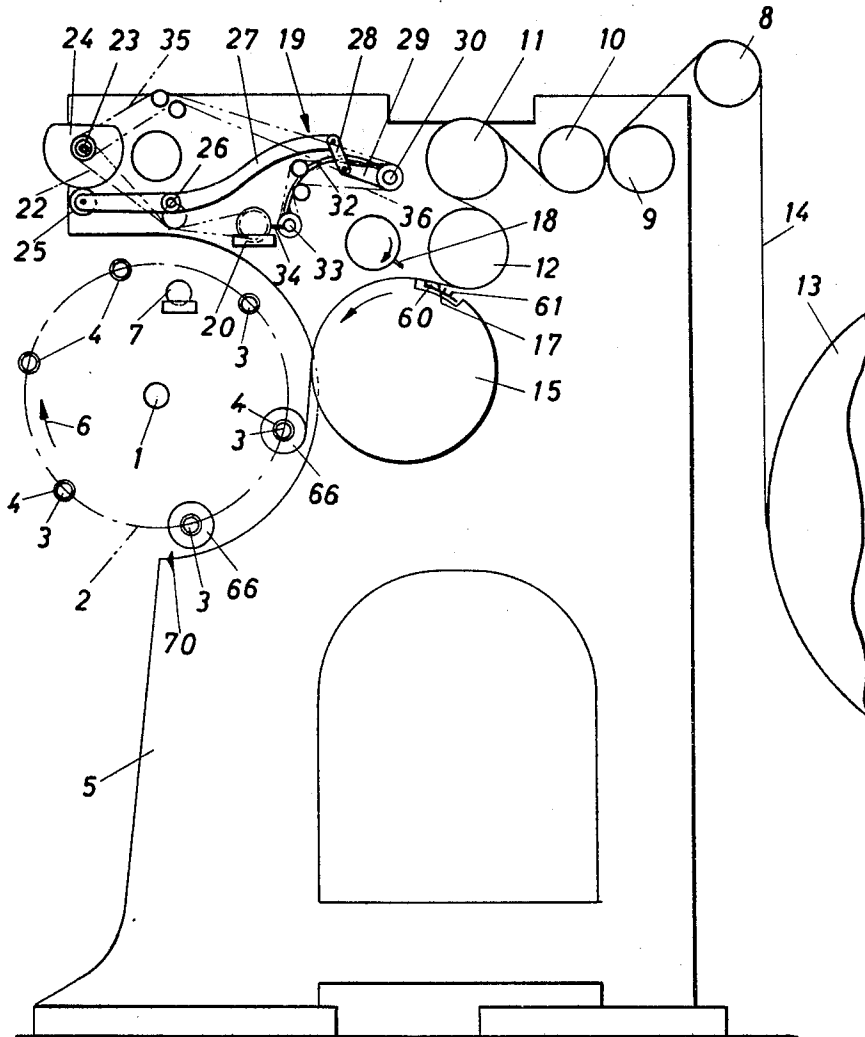
3,505,150

DEVICE FOR FIXING THE TERMINATING END OF PAPER ROLLS

Filed May 9, 1966

4 Sheets-Sheet 1

Fig.1



INVENTOR

Erik A.A. Andersson

BY

Wenderoth, Lind & Ponack  
Attorneys

April 7, 1970

E. A. A. ANDERSSON

3,505,150

DEVICE FOR FIXING THE TERMINATING END OF PAPER ROLLS

Filed May 9, 1966

4 Sheets-Sheet 2

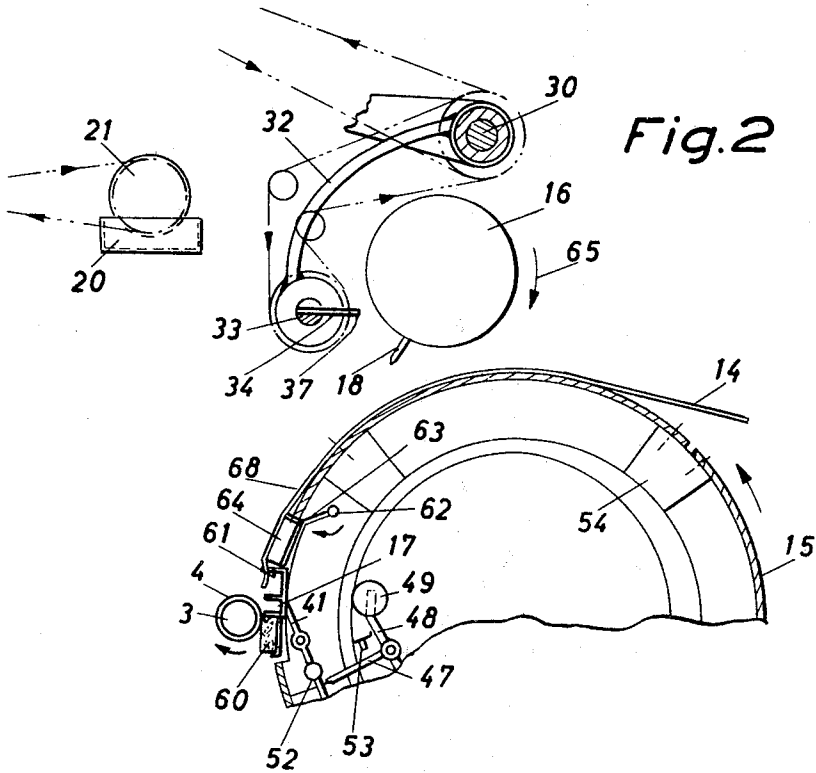


Fig. 2

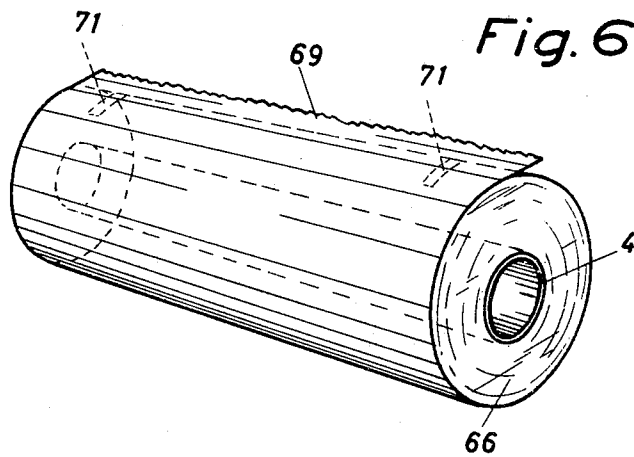


Fig. 6

INVENTOR

Erik A. A. Andersson

BY

Wenderoth, Lind & Ponack  
Attorneys

April 7, 1970

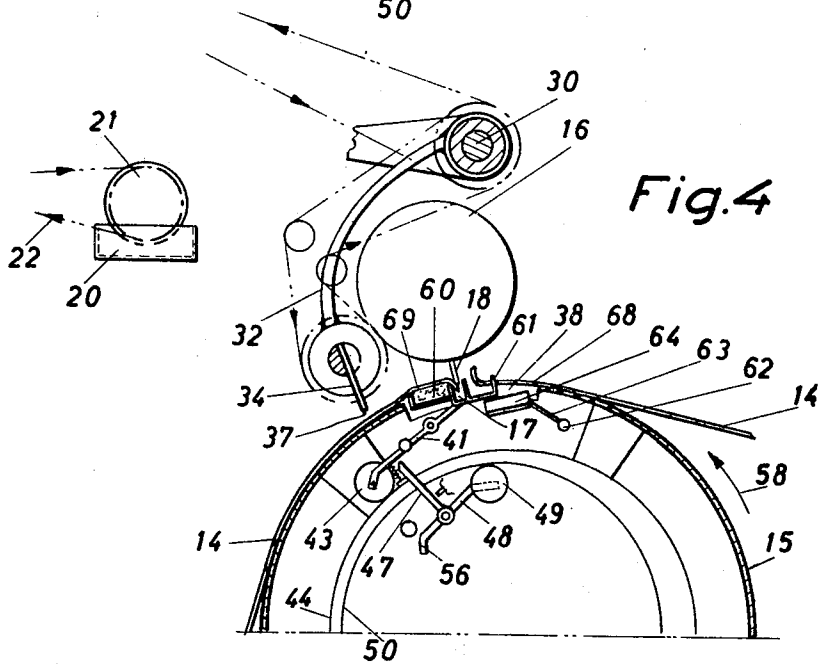
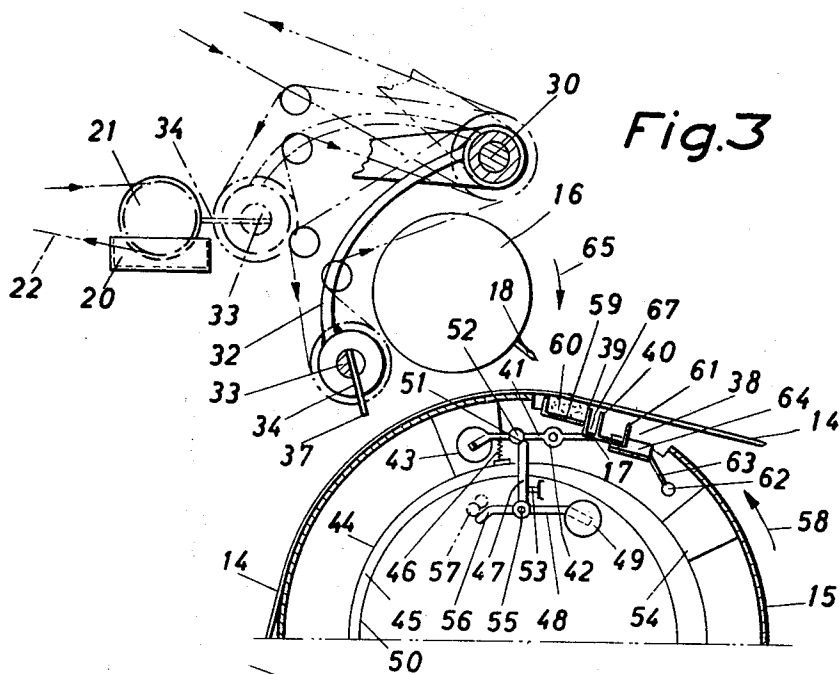
E. A. A. ANDERSSON

3,505,150

DEVICE FOR FIXING THE TERMINATING END OF PAPER ROLLS

Filed May 9, 1966

4 Sheets-Sheet 3



INVENTOR  
Erik A. A. Andersson  
BY  
Wenderoth, Lind & Ponack  
Attorneys

April 7, 1970

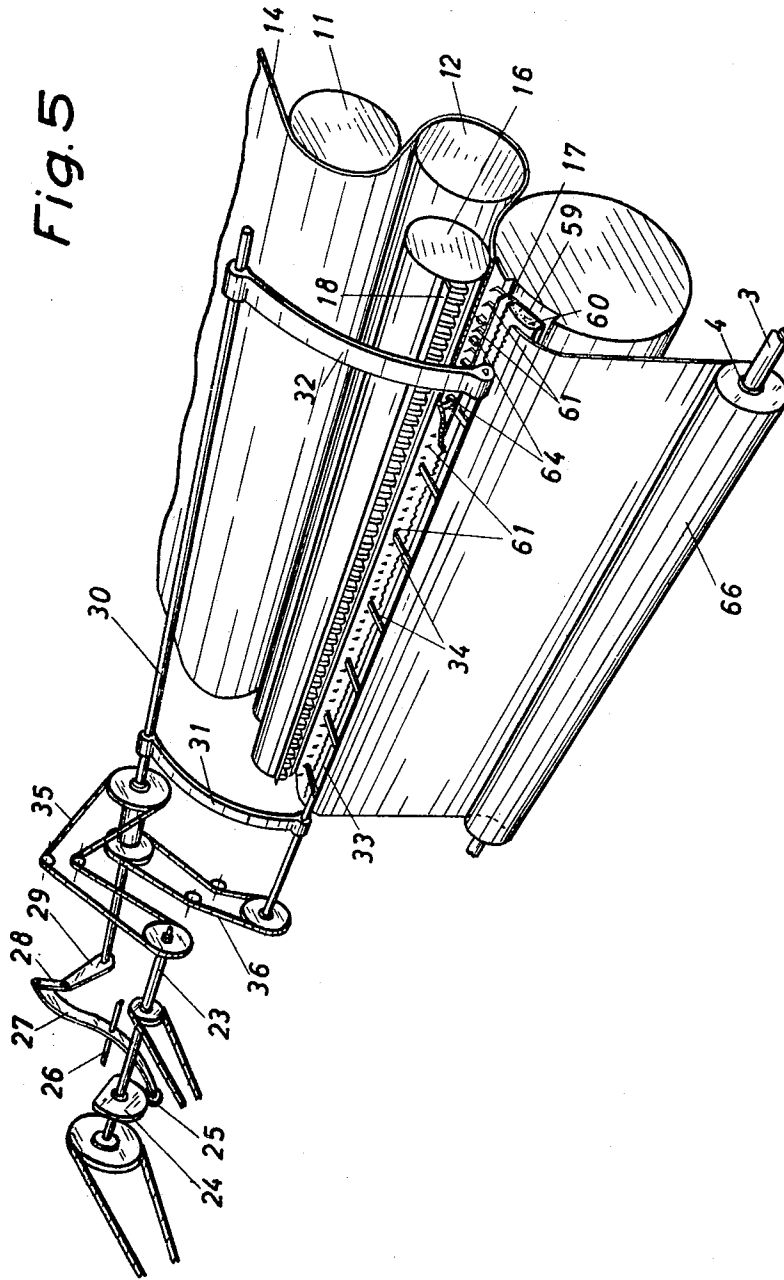
E. A. A. ANDERSSON

3,505,150

DEVICE FOR FIXING THE TERMINATING END OF PAPER ROLLS

Filed May 9, 1966

4 Sheets-Sheet 4



INVENTOR  
Erik A.A. Andersson  
BY  
Wenderoth, Lind & Ponack  
Attorneys

1

2

3,505,150

**DEVICE FOR FIXING THE TERMINATING END OF PAPER ROLLS**

Erik Arne Alvar Andersson, Jonkoping, Sweden, assignor to Munksjo Aktiefbolag, Jonkoping, Sweden, a corporation of Sweden

Filed May 9, 1966, Ser. No. 548,638

Claims priority, application Sweden, Apr. 12, 1966,

4,928/66

Int. Cl. B65h 35/04

U.S. Cl. 156—446

2 Claims 10

**ABSTRACT OF THE DISCLOSURE**

A device for attaching an end of a paper web wound into rolls on winding machines. Means are provided for dewinding a paper web from a storage roll. A rotating roller has means thereon for cutting the paper web transversely. There is a glue applying device having glue delivering means adapted to be brought into contact with the paper web closely adjacent the place where said web is cut in the feeding direction of the web. An element is provided upon the roller extending longitudinally thereof to lift the paper web away from the periphery of the roller so as to abut against the glue delivering means for applying glue on the paper web in combination with the cutting of the paper web. The lifting means is a rail connected to the cutting means and the cutting means has a U-shaped rail cooperating therewith.

At the manufacture of kitchen and toilet paper rolls one starts with rolls having a length of about two meters and comprising a web of creped paper wound on a core of pasteboard. The rolls are fed from a winding machine. The rolls are conveyed automatically to a cutting saw where they e.g. in pairs are cut to shorter rolls, viz kitchen and toilet paper rolls, having a length of about 23 cm. and 11–12 cm., respectively. The rolls thus obtained are conveyed to a wrapping machine in which they in pairs are enclosed in a wrapping material, preferably a transparent plastic foil. So as to render this procedure of manufacture completely automatic it is of utmost importance that the termination end of the paper web on each roll lies steadily against the mantle of each roll and thus the paper web of the roll cannot be unwound during the conveyance of the rolls from the winding machine via the cutting saw to the wrapping machine. Experiments of different kinds have been carried out for attaching the terminal end of the paper web to the rolls by means of a binding agent. However, for the reason that in modern rolling machines the speed of the paper web may reach a rate of 450 m./min. or more the problems of avoiding glue sprinkles become important and it has hitherto been very difficult to apply the glue in exactly the correct place on the paper web.

The present invention has for its object to overcome the above recited drawbacks and to render possible a continuous and fast rewinding of paper from a storage roll to rolls of a smaller diameter, the terminal ends of these rolls being glued to the mantle. More particularly, the invention has reference to winding machines provided with a device for dewinding a paper web from a storage roll, a roller driven for rotation and provided with means for cutting the web in the transverse direction, a glue applying device and a number of rotated spindles. A paper sleeve is adapted to be put on each one of these spindles for serving as a core at the winding of the paper web to a roll. The main feature of the invention is to be seen therein that the glue delivering means of the glue applying device is adapted to be moved towards the paper web at a place which is situated, as seen in the feeding direc-

tion of the web, just after the cutting station. A further feature of the invention consists therein that the cutting means roller is provided with an element extending in the longitudinal direction of the roller, said element adapted to lift out the paper web from the periphery of the roller against the glue delivering means for applying glue on the web in connection with the cutting of the web or immediately after this cutting operation. Due to the fact that the paper web, by the lifting means, is displaced to a position outside the periphery of the cutting means roller at a certain predetermined moment during one rotation of this roller and that this outward displacement of the paper web is preferably performed simultaneously with the cutting of the paper web in the transverse direction, it is rendered possible to apply the glue on the terminal end of the paper web in close vicinity of the transverse cutting border.

The invention will now be described with reference had to the attached drawings showing partly diagrammatically an embodiment of the machine according to the invention. In the drawings:

FIG. 1 shows a vertical cross section through a rewinding machine provided with a device according to the invention for attaching the terminal end of the paper web to a roll,

FIGS. 2, 3, and 4 show on an enlarged scale the cutting station with the device for attaching the terminal end at different phases during the winding,

FIG. 5 shows in perspective and on a somewhat reduced scale the device according to FIGS. 2–4, and

FIG. 6 shows in perspective a paper roll having a terminal end glued according to the invention.

The winding machine comprises a revolving head 2 journalled on a horizontal shaft 1, said head 2 provided with six journalled spindles 3 arranged in a circle. Each one of these spindles 3 is adapted to carry a paste board sleeve 4. The revolving head 2 is carried swingable in a vertical plane in the machine stand 5 in a way not shown in detail in the drawings and it is driven in the direction indicated by the arrow 6 in FIG. 1 and then the sleeves pass over and in contact with a knurled glueing roller 7 in such a way that peripheral glue strips are applied externally on the sleeves. The machine further comprises a number of guiding and feeding rollers 8, 9, 10, 11, and 12 which guide a paper web 14 from a storage roll 13 via a cutting device on two cooperating rollers 15 and 16 to the revolving head 2 and a paste board sleeve 4 on the spindle 3 being at the moment in question closest to the roller 15. There is arranged in the roller 15 a longitudinal cutting rail 17 of U-shaped cross section. The rail 17 cooperates with a radial rail 18 serving as a grate on the roller 16 as will be explained in the following.

Finally, there is included in the winding machine also a device 19 for applying glue on the paper web 14 in connection with the cutting of the paper web. This device comprises a rotating glue delivering roller 21 dipping down into a glue trough 20, said roller 21 being by means of a rubber belt 22 or the like driven from a shaft 23 being continuously driven from the gear box (not shown) of the machine. The shaft 23 also carries a cam disk 24 and a roll 25 abuts against the periphery of said disk 24. This roll 25 is arranged on one end of a two-armed lever 27 and this lever 27 is journalled about a bolt 26. The other end of the lever 27 is by means of a link 28 journalled to the free end of an arm 29 on the transverse shaft 30 in the machine stand 5. This shaft 30 is further provided with a downwards directed arcuate arm 31. A similar arm 32 is arranged at the opposite gable of the machine. By means of the constant abutment of the roll 25 against the cam disk 24 (this abutment may be obtained by means of a suitably arranged spring, not shown) the arms 31, 32 are forced during one rotation of the cam disk 24 to swing from an upper position to a lower

position (both positions shown in FIG. 3). Between the two arms 31, 32 there extends a journalled rod 33 and from this rod 33 there project radially a number of pegs 34 which at the rotation of the rod 33, when the arms 32 are in the swung-up position (see FIG. 1 and shown in FIG. 3 with dash and dot lines), pass with their free ends lightly touching the glue delivering roller 21 whereby a small quantity of glue is applied on the ends of the pegs 34. The rod 33 is driven by means of rubber belts 35, 36 or the like from the shaft 23. After the cam disk 24 having turned half a revolution from the position shown in FIG. 1, the arms 31, 32 are in their swung-down position (see the position shown with unbroken lines in FIG. 3) when the pegs 34 pass with their free ends 37 spaced only a small distance apart (e.g. about 2-4 mm.) from the paper web 14 passing over the upper roller 15.

The U-shaped rail 17 of the cutting device extending in the longitudinal direction of the roller 15 is inserted in a longitudinal groove 38 in the periphery of the roller. The rail 17 is with its two radially projecting ends 39, 40 which are directed radially outwards arranged on one end of two-armed levers 41 (only one shown in FIG. 3), these levers 41 arranged at both ends of the roller 15. The levers are journalled about a longitudinal shaft 42 and are at the end situated opposite the rail 17 provided with a roll 43 which is adapted to run against the outer curved path 44 of a stationary ring 45 when the tension spring 46 at a certain predetermined moment swings the levers 41 in counter-clockwise direction according to FIG. 3. The levers 41 are kept in the set-up position shown in FIG. 3 by an abutment arm 47 which is attached to or formed integrally with a two-armed lever 48, one end of the lever 48 provided with a roller 49 adapted at the swinging in counter-clockwise direction according to FIG. 3 to roll against the inner curve path of the ring 45. In the set-up position shown in FIG. 3 the arm 47 abuts with an inclining surface 51 against a small roller 52 on the lever 41 simultaneously as it abuts with its right hand side against an abutment 53 on the body 54 of the roller. The lever 48 is arranged on a longitudinal shaft 55 journalled in the roller body 54. The end 56 of the lever 48 opposed to the roller 49 is bent inwardly in the shape of an arc and is adapted to be influenced by an operation piston 57 which e.g. in an electro-mechanical way is displaced from the machine stand 5 into the movement path of the rod end 56 and thereby forces the lever 48 with the abutment arm 47 to swing in counter-clockwise direction according to FIG. 3 and then to free the levers 41 so as to permit it to be swung in counter-clockwise direction by the action of the spring 46 in such a way that the U-rail 17 is displaced radially outwards outside the periphery of the roller 15. The rail 17 presents at the front edge, as seen in the direction of rotation of the roller (see the arrow 58 in FIG. 3), a carrying rail 59 on the radially projecting surface provided with a strip of a longitudinal cushion 60 of foam plastic or a similar elastic material. As seen in the direction of movement of the roller 15 there is arranged, after the U-shaped rail 17 and parallel to the same, a row of pointed teeth 61 directed radially outwards and shaped as threads. The teeth 61 project from the rail and participate in the radial displacement of the same. These teeth 61 have for their object to retain the front end of the paper web 14 when this web has been cut by means of the cutting device. Between teeth 61 neighbouring each other in the row arms 63 are carried for being swung outwards on a longitudinal shaft 62 and each one of the arms 63 is at its free end provided with a cushion 64 of rubber or another suitably resilient material. These arms 63 with the cushions 64 have for their object to free the front end of the paper web from the teeth 61 at a certain predetermined moment by being swung in clockwise direction according to FIG. 3. The devices for swinging

the arms 63 are not shown in the drawings for the reason that they are not included in the present invention. The roller 15 which is driven in the direction of the arrow 65 is coupled to the roller 15 in such a way that when the rail 17 on this roller 15 is situated in front of this roller 15 the grate rail 18 is directed radially against the centre of the roller 15.

The function of the machine will now be described starting from the position shown in FIG. 1. The paper roll 66 is finished i.e. the intended length of paper web 14 has been wound on the paste board sleeve 4 on the spindle 3 in question. The arms 31, 32 have been swung downward (indicated by means of unbroken lines in FIG. 3) and the pegs 34 have reached the position in which they are directed obliquely downwards towards the roller 15. By means of an electric impulse (which is released when the paper web has been fed a certain length), the operation piston 57 has been displaced into the movement path of the lever 48 and swings the latter in counter-clockwise direction so as to free the levers 41 which, as has been described in the foregoing, causes a displacement in essentially radial outwards direction of the U-rail 17. Hereby the paper web 14 is lifted at this place away from the periphery of the roller 15 and when the grate rail 18 on the roller 15 then engages the space 67 between the branches 39 and 40 the paper web 14 is torn in transverse direction. By means of the radial displacement outwards of the web the teeth 61 are forced to penetrate the front end 68 of the paper web 14 and the end 68 thus is forced to follow the direction of rotation of the roller 15. When the terminal end 69 of the paper web of the paper roll 66 which end has, by the cushion 60, been brought to a position outside the periphery of the roller 15, reaches the pegs 34, the terminal end 69 will touch the ends 37 of the pegs and then a small quantity of glue will be applied on the paper web. When finally also the last portion of the paper web has been wound on the roll 66 while being pressed on from the outside (not shown in the drawings) the terminal end 69 will be retained by this binding agent. The finally wound roll 66 is removed from the spindle 3 in the stand 70 in FIG. 1. During the winding of the paper roll 66, the revolving head 2 rotates until a new spindle 3 with a paste board sleeve 4 provided with a binding agent from the roller 7 reaches a position in front of the roller 15. When this roller 15 has been rotated about a quarter of a revolution, the arms 63 are swung in clockwise direction according to FIG. 2 and moves the front end 68 of the paper web 14 radially outwards so that it leaves the teeth 61. In any case, the cushions 64 prevent the paper web from being, by the teeth 63, brought inside the periphery of the roller 15 when the U-rail 17 is retracted into the groove 38. When the front end 68 then comes into contact with the paste board sleeve 4 on the spindle 3, it will be stuck to the glue on the sleeve and then the paper web is wound on the sleeve which by means of friction is brought along in the rotation of the spindle 3. The roll 43 on the lever 41 then runs up on the curve path 44 which is shaped in such a way that it forces the lever 41 to be swung in clockwise direction and thereby forces the U-rail 17 with the cushion 60 and the teeth 61 into the groove 38 completely inside the periphery of the roller 15. Simultaneously the roller 49 runs on the lever 48 with the abutting arm 47 up on the curve path 50 and then forces the abutment arm to set the lever 41 until the course of events is repeated at the cutting of the paper web 14 when the new roll 66 has been completed.

In FIG. 6 there is shown a so-called kitchen paper roll as it appears after having been cut from a roll 6 wound in the winding machine. In this figure there is indicated two glue strips 71 by means of which the termi-

5

nal end 69 is retained to the next inner turn of the roll 66.

The invention has been described in the foregoing for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims. Thus, the different parts of the winding machine may be modified in many constructive respects without departure from the inventive idea. Thus, the paper web 14 may be cut by means of other means than a U-shaped rail 17 and a grate rail 18 cooperating with this U-shaped rail 17. Further it is possible to displace the cushion 60 in radial direction in order to lift the web 14 away from the periphery of the roller 15 by means of other elements than the ones shown in the drawings. The cushion 60 and its carrying rail 59 may be completely separated from the cutting means. The pegs 34 of the glue applying device may be replaced by rolls or stationary roll segments carried for rotation on the rod 33. The invention may be carried into effect also at the winding of other kinds of paper then creped paper in rolls.

What I claim is:

1. A device for attaching the terminal end of paper webs wound to rolls in winding machines comprising means for dewinding a paper web from a storage roll, a rotated roller, means on said roller for cutting said paper web in transverse direction at a cutting station, a glue applying device, a plurality of rotated spindles, a paste board sleeve on each of said spindles to serve as a core at the winding of said paper web to form a paper roll, a glue applying device comprising a glue delivering means brought into contact with said paper web immediately after said cutting station in the feeding direction of said paper web, an element on said roller extending longitudinally of said roller to lift said paper web in a direction away from the periphery of said roller to abut against said glue delivering means for applying glue on said paper web in combination with the cutting of said paper web, said glue applying device comprising a swingable arm, a row of pegs on said arm adapted, at the swinging upwards of said arm, to sweep off glue with their free ends from said glue delivering means and at the swinging downwards of said arm to be situated with said ends in the movement path of said lifting means when the latter is in its radially outer position and be touched by the portion of the paper web moved in outward direction.

2. A device for attaching the terminal end of paper webs wound to rolls in winding machines comprising

6

means for dewinding a paper web from a storage roll, a rotated roller, means on said roller for cutting said paper web in transverse direction at a cutting station, a glue applying device, a plurality of rotated spindles, a paste board sleeve on each of said spindles to serve as a core at the winding of said paper web to form a paper roll, a glue applying device comprising a glue delivering means brought into contact with said paper web immediately after said cutting station in the feeding direction of said paper web, an element on said roller extending longitudinally of said roller to lift said paper web in a direction away from the periphery of said roller to abut against said glue delivering means for applying glue on said paper web in combination with the cutting of said paper web, said element comprising a rail connected to said cutting means, said cutting means comprising a U-shaped rail which is radially displaceable in said roller together with said first mentioned rail, said first mentioned rail having a cushion of resilient material and said glue applying device comprising a swingable arm, a row of pegs on said arm adapted, at the swinging upwards of said arm, to sweep off glue with their free ends from said glue delivering means and at the swinging downwards of said arm to be situated with said ends in the movement path of said lifting means when the latter is in its radially outer position and be touched by the portion of the paper web moved in outward direction.

#### References Cited

##### UNITED STATES PATENTS

1,421,730	7/1922	Scusa	156—466 XR
2,507,144	5/1950	Christman	242—56.6
2,512,900	6/1950	Kwitek	242—56.6
2,585,226	2/1952	Christman	242—56.6
3,128,057	4/1964	Barnhart et al.	242—56
3,134,553	5/1964	DeGelleke	242—56
3,172,612	3/1965	Besserlich	156—184 XR
3,179,348	4/1965	Nystrand et al.	242—56
3,369,766	2/1968	Herman	242—56
3,393,105	7/1968	Tellier	156—187
3,342,434	9/1967	Conrad	242—56 XR

JOHN T. GOOLKASIAN, Primary Examiner

G. W. MOXON II, Assistant Examiner

U.S. Cl. X.R.

156—187, 295, 450, 457, 458; 242—56.6