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⑤④ Improved method and apparatus for dispensing web material from a roll.

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Description

The present invention relates to a method of and apparatus for dispensing web material from a roll.

Cabinets which contain rolled-up web material (e.g. a paper towel) are inspected periodically to check if the roll of web material has been used up and needs replacing. There is thus the possibility of a delay occurring between the exhaustion of the roll available for use and the next inspection. This has the disadvantage that a cabinet may be out of service for a period causing possible inconvenience to potential users of the web material.

The present invention seeks to overcome or reduce the above-noted disadvantage.

GB-A-774,970 proposes a dispensing device for roller towels in which a first unit with one towel is arranged above a second unit with a stand-by towel, the stand-by towel being made available for use after the said one towel has been used up. When inspecting the status of such a dispensing device, the attendant must either replace the towels in both units, which means that part of the discarded stand-by towel is never used, or else replace the towel in the first unit and recover the unused portion of the stand-by towel which is a time-consuming operation that means a smaller length of stand-by towel is available when the new towel in the first unit is also used up.

EPA-A-0172667 discloses a roller towel dispenser which comprises first and second means for mounting respective main and stand-by rolls of web material, first detecting means for detecting when the main roll is exhausted, and first control means responsive to said first detecting means for allowing dispensing of web material from the stand-by roll on the second mounting means, a second detecting means for detecting when the stand-by roll is exhausted, and second control means responsive to said second detecting means for allowing dispensing of web material from a new roll on the first mounting means. The arrangement described in EP-A-0172667 has the advantage that it can provide a continuous supply of web material with the entire length of every roll of web material being used. However, the dispenser described in EP-A-0172667 has the rolls disposed side-by-side thus doubling the width of the web dispenser. This can be an inconvenience.

GB Patent 1590048 describes a roller towel dispenser comprising main and stand-by rolls of web material, the main roll being mounted above the stand-by roll and material from the main roll being drawn through an open nip comprising two rollers which contains the leading end of the stand-by roll. One of the nip rollers is mounted on a spring-urged lever, the end of which is in contact with the web material leaving the main roll. Exhaustion of the material on the main roll causes the lever to pivot, thereby closing the nip and drawing the leading end of the stand-by roll through

the nip together with the trailing end of the main roll. In this way, a changeover from the main roll to the stand-by roll is effected and a continuous supply of material is maintained until such time as the stand-by roll is exhausted. Both rolls must then be replaced since the material from each roll follows a different path to the nip.

This invention relates to a method of automatically securing the leading end of a web on a stand-by roll to the trailing end of a web on the main roll, the web from the stand-by roll following the same course taken by the web from the roll which has just become exhausted so that the two mountings are used alternately for the main and stand-by rolls.

According to one aspect of the present invention, a method for dispensing web material first from a main roll and then from the stand-by roll comprises drawing the web from the main roll through a nip containing the leading end of web from the stand-by roll, and providing a region of the web of the main roll adjacent to the trailing end thereof with an enhanced coefficient of friction to the leading end of the web from the stand-by roll so that as the said region is drawn through the nip, the stand-by web is advanced with the main-roll web.

Conveniently, in the case of webs of non-woven fibrous towel material, the region of enhanced coefficient of friction is provided at least in part by a layer of adhesive material. Adhesive material can be applied on one face of the main-roll web and a layer of material to which the adhesive material will not adhere (herein referred to as a "release" material) can be applied on the opposite face of the main roll web such that in the main roll, the release layer confronts the layer of adhesive material preventing adhesion between adjacent turns of the main roll web close to the trailing end thereof. Thus, for example, a strip of double-sided self-adhesive plastics tape can be applied to the outer face of the main roll web over a short length thereof close to the trailing end and a length of plastics release tape coated with adhesive on just one side and somewhat longer than said short length can be stuck to the opposite face of the main roll web in the vicinity of the double-sided self-adhesive tape.

As an alternative, the web along, and in the immediate vicinity of, its trailing edge in both the main- and stand-by rolls can be coated with a narrow transverse strip of non-setting adhesive material and the core of the roll (around which the web is wound) can be treated with release material.

In a different arrangement, a region at the trailing end of the web in the main roll and a region at the leading end of the web in the stand-by roll are each coated with adhesive material (which can be dried or set) which sticks one region to the other but neither region to other areas of the webs. Thus the same self-sealing adhesive material can be applied in a narrow trans-

verse strip adjacent the opposite ends of the web in each roll. Such material can be applied on both sides of the web at each end in each roll whereby the leading end of the web in the stand-by roll waits in the nip (unmoved by the frictional drag with uncoated web material from the main roll) until a second strip of self-sealing adhesive material enters the nip with the trailing end of web in the main roll whereupon a self-sealing action occurs between the two strips of adhesive material, tagging the two webs together.

In a still further arrangement, a friction-enhancing material (e.g. an adhesive) is microencapsulated in one or more regions adjacent to the trailing end of the web in each roll, whereby when a trailing end enters the nip the microcapsules break open to release an instant-acting friction-enhancing material which ensures advance of the two webs together through the nip.

To prevent friction-enhancing material appearing at the longitudinal edges of the web in a roll (or when activated in the nip) it is desirable to keep a narrow strip (e.g. 2.5 cms. wide) of the web adjacent to each longitudinal edge free of such material.

The stand-by roll can be identical to the main roll so that it can, in turn, become the next main roll and in like manner will adhere to a new stand-by roll placed in juxtaposition therewith by an attendant when the core of the now-expanded main roll is removed.

The nip can be provided between a freely-rotatable roller and a spring-urged roller, rod or arcuate bar, the pressure generated by the spring urging being insufficient to advance the leading end of the web from the stand-by roll through the nip until the frictionally enhanced region of the main roll web appears in the nip.

The method of the invention finds particular utility in paper roller towel dispensers where a freely hanging loop of web material downstream of the nip is disposed outside a cabinet housing the two rolls, the loop being available for use as a towel and used web material from the loop being automatically wound-up on a "waste" roll within the cabinet. Where used web material is to be wound-up on a "waste" roll it is important that the trailing end of web from the main roll is adhered to the leading end of web from the stand-by roll strongly enough to allow the overlapped ends to remain adhered together as they are used as a towel so that, without rethreading by an attendant, the conjoined webs follow one another onto the waste roll.

The drive for the waste roll can be from a roller of the nip and preferably acts via the periphery of the growing waste roll to ensure a sensibly constant size for the available loop of material exposed outside the cabinet.

Expressed in terms of apparatus, the invention comprises web dispensing apparatus having first and second rolls of web material, means to rotatably sup-

port the two rolls of web material so that web material can be drawn off each roll and nip means in which web material from the first roll and the leading end of web material from the second roll are pressed together, the pressure exerted by said nip means on the overlaid web materials being insufficient to advance web material from the second roll with web material from the first roll until a region of enhanced coefficient of friction on the web material from the first roll is drawn through the nip.

The invention will now be further describe, by way of example, with reference to the accompanying drawing, the sole figure of which is a schematic perspective view of one arrangement of apparatus for carrying out the method of the invention.

Referring to the drawing, the trailing end 1 of a web 2 from a main roll (shown in chain lines at 3 – since it is now exhausted) passes through a nip 4 together with the leading end 5 of a web 6 from a stand-by roll 7.

The web 2 forms a user loop 8 which is exposed below a cabinet (not shown but housing the apparatus illustrated), the upper end of the loop 8 ending in a waste material roll 9.

The nip 4 is shown as being defined between a pair of rollers 10, 11 urged together by a pair of helical springs 12. Other arrangements of the nip 4 are possible however, and the roller 10 can, for example, be replaced by a stationary rod of circular cross-section or by a bar of arcuate shape presenting a concave region to the roller 11. It will be appreciated that by shaping the two components defining the nip 4, to increase the area of contact between the webs 2 and 6 the frictional drag exerted on the web 6 by drawing the web 2 through the nip can be controlled. In general, it is desirable for the length of web drawn into the loop 8 by a user to closely correspond to the length of web taken out of the loop 8 by winding up on the waste roll 9. A suitable drive for the waste roll 9 which achieves this, can conveniently be obtained by using drive from a roller in the nip onto the periphery of the waste roll 9. For this reason it is generally convenient to use at least one roller in the nip 4, to increase the frictional drag between the web 2 and that one roller to a point where slip is unlikely to occur as web is drawn through the nip and to drive the waste roll 9 from the said one roller.

The invention concerns a method of ensuring that as the trailing end 1 of the web 2 passes through the nip 4 it will draw the web 6 through the nip with it. Most desirably (and as shown in the drawing) the trailing end 1 is adhered to the web 6 close to the leading end 5 thereof so that the web 6 will enter the loop 8 and will eventually be wound up on the waste roll 9. To achieve the adherence, a strip of material having an exposed adhesive layer 13 is secured to the face of the web 2 which contacts the web 6. This can conveniently be a strip of double-sided self-adhesive tape.

To prevent the exposed adhesive layer 13 sticking to the web 2 wound over it on the main roll 3, the under-side of the web 2, in the vicinity of the layer 13 is provided with a strip of "release" material (as hereinbefore described). The area of the release strip is shown by chain lines 14 in the drawing.

The rolled up end of the web 6 on the stand-by roll will be similarly provided with an adhesive layer 13 and a release strip 14 so that when the stand-by roll becomes a new main roll, its web can become adhered to the leading end of the web from a new roll replacing the now-exhausted main roll 3.

Although the layer 13 is shown extending across the full width of the web 2 it is possible, for example, to use two narrow longitudinally extending strips of adhesive material parallel to the edges of the web 2. It is desirable to keep adhesive material away from at least the longitudinally outermost 2 cms. wide strips 13a, 13b of the web 2.

With the arrangement shown in the drawing, the engagement between the trailing end of web 2 and the leading end of web 6 must be secure enough to allow user-withdrawal of web 6 from the roll 7 throughout the entire loop 8 and onto the roll 9.

By making the layer 13 a dried adhesive material that only sticks to itself and coating the leading end of the web 6 with a similar layer 15, the release strip 14 can be dispensed with. The layer 15 lies in the entrance to the nip 4 and although contacted by the web 2 as it is advanced through the nip the web 6 does not get drawn further into the nip 4 until contact between the layers 13 and 15 occurs.

It can be desirable to give some indication, viewable from outside the cabinet housing, the mechanism shown in the drawing, that the stand-by roll has been brought into use. This can be provided by means of a roller turned by the web 6 but not by the web 2, the roller having a striped pattern on a region disposed behind a viewing window. It is also possible to arrange for the core of each fully consumed roll to fall into a chute where it is visible at least by a person servicing the apparatus.

Although the invention is expected to find its most important application in the use of non-woven webs (e.g. of moisture-absorbent paper) which are discarded after a single use, it is not ruled out that the invention could be used with more durable webs e.g. a woven fabric) that are reused after laundering.

Claims

1. A method for dispensing web material first from a main roll (3) and then from a stand-by roll (7) comprising drawing the web (2) from the main roll through a nip (4) containing the leading end (5) of web (6) from the stand-by roll, and providing a region (13) of the web of the main roll adjacent to the trailing end (1)

thereof with an enhanced coefficient of friction to the leading end of the web from the stand-by roll so that as the said region is drawn through the nip, the stand-by web is advanced with the main-roll web.

2. A method as claimed in claim 1, in which the region (13) of enhanced coefficient of friction is provided at least in part by a layer of adhesive material.

3. A method as claimed in claim 2, in which said region (13) adjacent to the trailing end (1) of the main roll (3) and a region (15) adjacent to the leading end (5) of the stand-by roll (7) are both coated with adhesive which sticks one region to the other but neither region to other areas of the webs.

4. A method as claimed in claim 3, in which the same self-sealing adhesive material is applied in strips on both sides of the web at each end of each roll whereby the leading end (5) of the web (6) in the stand-by roll (7) waits in the nip (4) until a second strip (13) of self-sealing adhesive material enters the nip with the trailing end (1) of the web (2) in the main roll (3), whereupon a self-sealing action occurs between the two strips of adhesive material tagging the two webs together.

5. A method as claimed in any one preceding claim, in which the nip (4) is provided between a freely-rotatable roller (11) and a spring-urged roller, rod or arcuate bar (10), the pressure generated by the spring urging (12) being insufficient to advance the leading end (5) of the web (6) from the stand-by roll (7) through the nip until the frictionally enhanced region (13) of the main-roll web (2) appears in the nip.

6. A method as claimed in any one preceding claim, in which the web (2, 6) is paper towel material and a loop (8) of such material, downstream of the nip (4), is disposed outside a cabinet housing the two rolls (3, 7).

7. A method as claimed in claim 6, in which after forming the loop (8) the web material is wound up on a waste roll (9) within the cabinet

8. Web dispensing apparatus comprising first (3) and second (7) rolls of web material (2, 6), means to rotatably support the two rolls of web material so that web material can be drawn off each roll and nip means (4) in which web material from the first roll and the leading end (5) of web material from the second roll are pressed together, characterised in that the pressure exerted by said nip means on the overlaid web materials is insufficient to advance web material from the second roll with web material from the first roll until a region (13) of enhanced coefficient of friction located at the trailing end of the first roll is drawn through the nip.

Ansprüche

1. Verfahren zum Ausgeben von bahnförmigem Material, zuerst von einer Hauptrolle (3) und dann von

einer Bereitschaftsrolle (7), bei welchem Verfahren die Bahn (2) von der Hauptrolle durch einen Spalt (4) gezogen wird, der das vorangehende Ende (5) einer Bahn (6) von der Bereitschaftsrolle enthält, und ein Gebiet (13) der Bahn der Hauptrolle, welches an das hintere Ende (1) derselben angrenzt, mit einem erhöhten Reibungskoeffizienten gegenüber dem vorangehenden Ende der Bahn der Bereitschaftsrolle versehen wird, so daß die Bereitschaftsbahn mit der Hauptrollenbahn vorwärts bewegt wird, wenn das genannte Gebiet durch den Spalt gezogen wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Gebiet (13) mit erhöhtem Reibungskoeffizienten mindestens teilweise durch eine Schicht aus Klebmaterial gebildet wird.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß das genannte Gebiet (13), welches an das hintere Ende (1) der Hauptrolle (3) angrenzt, und ein Gebiet (15), welches an das vorangehende Ende (5) der Bereitschaftsrolle (7) angrenzt, beide mit einem Klebstoff bedeckt sind, der ein Gebiet an das andere heftet, jedoch keines dieser Gebiete an andere Bereiche der Bahnen.

4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, daß das gleiche selbstklebende Klebmaterial in Streifen an beiden Seiten der Bahn an jedem Ende jeder Rolle aufgebracht wird, wobei das vorangehende Ende (5) der Bahn (6) in der Bereitschaftsrolle (7) im Spalt (4) wartet, bis ein zweiter Streifen (13) aus selbstklebendem Klebmaterial in den Spalt mit dem hinteren Ende (1) der Bahn (2) in der Hauptrolle (3) eintritt, worauf ein Selbstklebevorgang zwischen den beiden Streifen aus Klebmaterial auftritt, der die beiden Bahnen zusammenhängt.

5. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Spalt (4) zwischen einer frei drehbaren Walze (11) und einer federbelasteten Walze, Stange oder gebogenen Leiste (10) vorgesehen ist, wobei der durch die Federbelastung (12) erzeugte Druck nicht ausreicht, um das vorangehende Ende (5) der Bahn (6) der Bereitschaftsrolle (7) durch den Spalt vorwärts zu bewegen, bis das mit erhöhter Reibung ausgestattete Gebiet (13) der Hauptrollenbahn (2) im Spalt erscheint.

6. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Bahn (2, 6) ein Papierhandtuchmaterial ist, und eine Schleife (8) eines solchen Materials, in Laufrichtung gesehen nach dem Spalt (4), außerhalb eines Gehäuses, welches die beiden Rollen (3, 7) aufnimmt, angeordnet ist.

7. Verfahren nach Anspruch 6, dadurch gekennzeichnet, daß das Bahnmaterial nach dem Formen der Schleife (8) auf eine im Gehäuse befindliche Gebrauchtmateriale (9) aufgewickelt wird.

8. Vorrichtung zum Ausgeben von bahnförmigem Material, welche Vorrichtung erste (3) und zweite (7) Rollen aus bahnförmigem Material (2, 6), Mittel zur

drehbaren Lagerung der beiden Rollen aus Bahnmaterial, so daß das Bahnmaterial von jeder Rolle abgezogen werden kann, und Spaltnittel (4) aufweist, in denen Bahnmaterial von der ersten Rolle und das vorangehende Ende (5) von Bahnmaterial der zweiten Rolle zusammengepreßt werden, dadurch gekennzeichnet, daß der Druck, der durch die genannten Spaltnittel auf die übereinandergelegten Bahnmaterialien ausgeübt wird, ungenügend ist, um Bahnmaterial von der zweiten Rolle mit dem Bahnmaterial von der ersten Rolle vorwärts zu bewegen, bis ein Gebiet (13) mit erhöhtem Reibungskoeffizienten, welches am hinteren Ende der ersten Rolle liegt, durch den Spalt gezogen wird.

Revendications

1. Procédé pour distribuer une matière en bande tout d'abord d'un rouleau principal (3), puis d'un rouleau de réserve (7), consistant à tirer la bande (2) du rouleau principal à travers une emprise (4) contenant l'extrémité de tête (5) de la bande (6) du rouleau de réserve, et à présenter une région (13) de la bande du rouleau principal, à proximité de son extrémité de queue (1), à coefficient de friction accru, à l'extrémité de tête de la bande du rouleau de réserve, de telle sorte que, lorsque ladite région est tirée à travers l'emprise, la bande de réserve avance avec la bande du rouleau principal.

2. Procédé suivant la revendication 1, dans lequel la région (13) à coefficient de friction accru est formée au moins en partie par une couche de matière adhésive.

3. Procédé suivant la revendication 2, dans lequel ladite région (13) adjacente à l'extrémité de queue (1) du rouleau principal (3) et une région (15) adjacente à l'extrémité de tête (5) du rouleau de réserve (7) sont toutes deux revêtues d'un adhésif qui fait adhérer une région à l'autre, mais ni l'une ni l'autre de ces régions à d'autres zones des bandes.

4. Procédé suivant la revendication 3, dans lequel la même matière adhésive autocollante est appliquée en languettes sur les deux faces de la bande, à chaque extrémité de chaque rouleau, de sorte que l'extrémité de tête (5) de la bande (6) du rouleau de réserve (7) attend dans l'emprise (4) jusqu'à ce qu'une seconde languette (13) de matière adhésive autocollante pénètre dans l'emprise avec l'extrémité de queue (1) de la bande (2) du rouleau principal (3), suite à quoi un effet d'autoadhésion se produit entre les deux languettes de matière adhésive, attachant les deux bandes l'une à l'autre.

5. Procédé suivant l'une quelconque des revendications précédentes, dans lequel l'emprise (4) est formée entre un rouleau (11) tournant librement et un rouleau, une tige ou une barre courbe (10) à ressort, la pression engendrée par le ressort (12) étant insuffi-

fisante pour faire avancer l'extrémité de tête (5) de la bande (6) du rouleau de réserve (7) à travers l'emprise jusqu'à ce que la région à friction accrue (13) de la bande (2) du rouleau principal apparaisse dans l'emprise.

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6. Procédé suivant l'une quelconque des revendications précédentes, dans lequel la bande (2, 6) est une matière de serviette en papier et une boucle (8) de cette matière, en aval de l'emprise (4), est disposée à l'extérieur d'un habillage contenant les deux rouleaux (3, 7).

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7. Procédé suivant la revendication 6, dans lequel, après formation de la boucle (8), la bande est enroulée sur un rouleau de bande souillée (9), à l'intérieur de l'habillage.

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8. Appareil distributeur de bande comprenant un premier rouleau (3) et un second rouleau (7) de bande (2, 6), des moyens pour supporter les deux rouleaux à rotation de telle sorte que de la bande puisse être dévidée de chaque rouleau et une emprise (4) dans laquelle la bande du premier rouleau et l'extrémité de tête (5) de la bande du second rouleau sont pressées l'une contre l'autre, caractérisé en ce que la pression exercée par l'emprise sur les bandes appliquées l'une contre l'autre est insuffisante pour faire avancer la bande du second rouleau conjointement avec la bande du premier rouleau jusqu'à ce qu'une région (13) à coefficient de friction accru, située à l'extrémité de queue du premier rouleau, soit tirée à travers l'emprise.

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