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(54) **Method and apparatus for forming scored lines on sheet material.**

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EP 0 403 089 B1

Description

This invention relates to a method and apparatus for forming non-penetrative scored lines on sheet material, e.g. paper, more particularly, but not exclusively, for use in the manufacture of adhesive label laminates.

Adhesive label laminates usually consist of a release sheet or liner carrying a release coating, typically a silicone coating, which supports a label sheet having on its reverse a coating of pressure sensitive adhesive. The characteristics of the release coating ensure that one element of the laminate can be readily peeled from the other, and that the adhesive remains on the label sheet.

However, when a label is required for use, difficulties can arise in peeling the release liner from the label due to the fact that no available edge of the backing sheet is exposed to be gripped by the fingers to enable peeling to be effected.

US-A-3,859,157 proposes as a solution to this problem the provision of scored lines of weakness on the reverse of the release liner. When the laminate is then flexed about an axis generally parallel to a scored line, the release liner cracks along the scored line to present two edges which can be gripped to peel the liner from the label.

The apparatus proposed in the above mentioned United States Patent Specification for the formation of such scored lines consists of two metal rolls which form a nip, with one of the rolls having a series of spaced parallel wires secured so as to extend axially, helically or circumferentially across the surface thereof. Transverse, diagonal or longitudinal scored lines are formed on the label laminate by passing the release liner through the roll nip with the non release coated face presented for engagement with the wires. The nip pressure is sufficient to compact the paper along the scored lines and to render the paper locally weakened.

It has been found, however, that apparatus of the kind described cannot be relied upon to produce scored lines of consistent depth. This may principally be due to the lack of resilience of the surfaces of either of the metal rolls, which manifests itself as insensitivity to variations in laminate thickness, or may be due to mechanical inaccuracies in the rolls due to manufacturing tolerances or may be due to roll deflections during use. As a result, for a given nip pressure between the rolls, the release liner will unpredictably be under scored or over scored or unevenly scored. Such a liner will either not crack along a scored line when required to do so, or a cut will be formed through the liner and sometimes into the label sheet.

A solution to the problem of variability in scoring described above is proposed in the US-A-4,678,457 and US-A-4,698,052 whereby the latter document discloses the combination of features according to the preambles of claims 1 and 9. US-A-4,678,457 teaches the replacement of the metal roll of US-A-3,859,157 which carries circumferential scoring wires with a series of spaced and independently mounted rotary crush scoring knives extending in spaced relation across the width of the smooth metal backing roll, and each formed with a rounded crushing edge. US-A-4,698,052 teaches the replacement of the metal backing roll of US-A-3,859,157 with a series of spaced and independently mounted anvil rollers extending in staggered relation across the width of the wire wound metal scoring roll.

The crush scoring knives of US-A-4,678,457 and the anvil rollers of US-A-4,698,052 are each carried in a mounting bracket which is biased towards the co-operating backing or scoring roller by air pressure, but which is mounted in such a manner that movement towards or away from the co-operating roller is in an essentially friction-free manner.

The use of friction-free moveable mounting brackets as described above enables the crush scoring knives or anvil rollers to float with fluctuations in paper thickness, and thus overcomes the over and under scoring problem experienced with the apparatus of US-A-3,859,157.

It is among the objects of the present invention to provide an alternative method and apparatus for forming scored lines on sheet material, especially label laminates, which takes account of variability in laminate thickness, and which has particular advantages for use in the formation of scored lines at an acute angle, typically 45° to the longitudinal axis of the sheet.

According to the invention there is provided a method of forming a scored line on a sheet of scorable material comprising the step of passing the sheet through the nip of a pair of contra-rotating rolls, one of which rolls is an anvil roll having a hard surface, and the other of which rolls is a scoring roll having a hard surface with at least one scoring element thereon said scoring element being a tensioned wire, characterised in that the said scoring roll has a resilient surface having a Shore D hardness in the range 60° to 85° and in that the scoring roll has the said at least one scoring element extending over its surface. It has been found that by this method the scoring element is pressed evenly into the sheet to be scored irrespective of the normally occurring variations in thickness of the sheet as described previously. It is assumed that during the scoring process the scoring element resiliently deforms the resilient surface of one of the rolls to a varying extent to compensate for the varying thickness of the sheet so

that the scoring remains substantially constant.

The Shore D hardness is measured according to International Standard ISO 868-1978 (British Standard BS2782:Part 3:Method 365B:1981 or Standard D2240 of the American Society for Testing Materials).

Preferably the method comprises the step of applying pressure to the rolls to control the nip. The nip force of the rolls will preferably lie in the range 313 to 717 Newtons per wire when scoring sheets of paper.

Preferably the method comprises the preliminary step of adjusting the pair of rolls so that the axis of one of them is disposed either upstream or downstream with respect to the axis of the other roll to a small extent e.g. by an amount of around 1 mm.

The method may comprise the preliminary step of arranging the hard roll to form a nip only with its central portion so as to leave marginal portions of the sheet unscored.

The method may comprise the preliminary step of skewing the axes of the pair of rolls relative to one another to a small extent or for example one or two degrees.

The method may comprise the preliminary step of wrapping a scoring element helically round the resilient roll and tensioning the scoring element.

From another aspect the invention provides a method of making a laminate for use in making a label or the like from a paper fibrous material layer, comprising the steps of applying a liquid release coating to one surface of the paper layer and drying it thereon, thereafter forming a plurality of weakened reduced thickness score lines in the other surface of the paper layer by passing the paper layer through the nip of a pair of contra-rotating rolls, one of which rolls has a hard surface and the other of which rolls has a resilient surface having a Shore D hardness in the range 60° to 85°, and wherein the roll having a resilient surface has at least one scoring element extending over its surface, the said scoring element being a tensioned wire, and finally laminating a layer of adhesive and a face sheet to said paper layer, said adhesive layer being intermediate the paper layer and the sheet and being bonded to the said one surface of the paper layer.

From another aspect the invention provides apparatus for scoring sheet material comprising a rotatably mounted scoring roll having at least one linear scoring element (17) in the form of a tensioned wire thereon, a co-operating rotatably mounted anvil roll having a hard surface, the rolls forming a hip through which scorable material can be passed for the formation of scored lines thereon, characterised by said scoring roll having said at least one linear scoring element extending over a resilient surface layer on said scoring roll, and said resilient surface layer having Shore D hardness in the range 60° to 85°. The hardness is measured according to International Standard ISO 868-1978 (British Standard BS2782:Part 3:Method 365B:1981 or Standard D2240 of the American Society for Testing Materials).

It will be understood that the required depth of score will vary depending upon the material being scored and the purpose for which the score is being applied. Furthermore, for any particular material being scored, variations in the depth of score within certain limits are in practice acceptable. The term "required depth" is understood as being any depth of score within such acceptable limitations.

Preferably the scoring and anvil rolls are made of steel and the resilient material is preferably polyurethane. Preferably, the resilient material has a Shore D hardness of about 70° to about 80° measured as specified above and optimally the hardness is about 75°.

Use of a resilient surface layer having a hardness of less than 60° results in uncontrollable variability in the scored lines, and generally to underscoring. If the hardness is greater than 85°, the roll system is insufficiently sensitive to variations in laminate thickness and over or under scoring results.

The rolls may be disposed with their axes extending horizontally and with the anvil roll positioned substantially vertically above the scoring roll.

The axis of the anvil roll may be offset slightly upstream or downstream on the axis of the scoring roll in the direction of sheet movement, for example by an amount of 1 mm. Such an offset has been found to afford increased stability of operation.

Advantageously, the anvil roll is also formed with a central land which forms the nip with the scoring roll so that scoring is not effected across the full width of the scored web. This has been found to give more reliable operation, in that the full tensile strength of the web is present at the web edge, so reducing the chance of the web breaking. Furthermore, the axis of the anvil or scoring roll may be skewed very slightly, for example by 1° or 2° with respect to the axis of the other roll, the amount of skew depending on the length of the rolls. Such skewing can sometimes improve the pressure distribution across the nip, depending on the length, diameter and degree of flexibility, perpendicular to their axes, of the scoring and anvil rolls.

The linear scoring elements preferably present a radiused edge, having a diameter of about 1.2 mm. The use of wire, such as 18 gauge piano wire, having a diameter of 1.15 mm, has been found to be satisfactory and that simple tensioning of such

wire across the surface of the roll affords adequate stability. The use of linear scoring elements which have too small a diameter, for example 0.5 mm or the use of linear scoring elements of too great a diameter, for example 2.0 mm will require different and excessive nip pressures in order to achieve scoring. Also the performance of the final product may not be as acceptable.

The linear scoring elements are preferably straight and extend in parallel relation across the surface of the scoring roll. However, the use of divergent or convergent elements is not excluded, provided that they do not intersect. The linear scoring elements may also have other configurations, for example a sinusoidal configuration.

The use of axially aligned linear scoring elements is undesirable since their use might lead to excessive repetitive shocks on the roller bearings as the scoring elements enter the nip, especially during high speed operation. In addition very high nip pressures would be required to achieve scoring since adequate pressure would need to be applied to the entire length of each scoring element as it passes through the nip.

Circumferentially extending linear scoring elements may be used for the formation of longitudinal score lines in the sheet, provided that they extend across a resilient surface formed on the roll in accordance with the invention. If the wires are applied circumferentially to a metal surfaced roll, wire movement may otherwise take place as a result of slackening caused by localised stretching produced when the wire is subjected to nip pressure.

The invention will now be further described with reference to the accompanying drawings in which:-

Figure 1 is a semi-diagrammatic front elevation, partly in section of a scoring apparatus embodying the invention;

Figure 2 is an end elevation on the line II-II of Figure 1, and

Figure 3 is an isometric view of the apparatus of Figure 1 in use for scoring the reverse of the release sheet of an adhesive laminate.

Referring first to Figures 1 and 2 of the drawings, the apparatus 1 shown comprises a pair of vertical side frames 2 each formed with a vertical slideway 3 at the upper end and a horizontal slideway 4 at the lower end.

A roll 5 comprises a cylindrical steel shell 6 extending between end plates 7, the end plates 7 being carried on stub shafts 8. The stub shafts 8 are journalled for rotation in bearing blocks 9 having horizontal slideways grooves 10 co-operable with the horizontal slideways 4. The bearing blocks 9 are secured in the required position in the slideways 4 by conventional jacking bolts (not shown) whereby the axis of rotation of the roll 5 can be shifted in a horizontal plane.

The surface of the cylindrical shell 6 carries a resilient sheath 11, 12 mm thick, of polyurethane resin. The cured resin has Shore D hardness of around 75° measured according to International Standard ISO 868-1978 (British Standard BS2782:Part 3:Method 365B:1981 or Standard D2240 of the American Society for Testing Materials).

At one end of the roll 5, the stub shaft 8 has a flanged boss 12 secured thereon, with the flange 13 thereof having a diameter slightly larger than that of the cylindrical shell 6. A series of regularly spaced small axially extending apertures (not shown) are formed in the flange 13 near the periphery thereof, with each hole being intersected by a threaded radial hole (not shown) in which a grub screw (not shown) is engaged.

At the other end of the roll 5 a further boss 14 is secured on the other stub shaft 8. The boss 14 carries two flanges, 15 and 16. The flange 15 has secured in the periphery thereof a series of radially extending and regularly spaced steel pins (not shown) formed with apertures extending parallel to the axis of the roll 5. The flange 16 is formed with axially extending and regularly spaced threaded radial holes (not shown) each fitted with a grub screw essentially as described with reference to the flanged boss 12.

A series of 18 gauge wires (1.2 mm in diameter) are passed through the axial holes in the flange 13 and the wire ends secured therein by tightening the grub screws. The wires are laid helically and in parallel relation across the surface of the polyurethane coating 11 and at an angle of 45° to the axis of the roll 5. At the other end of the roll 5, the wires are passed around the radially extending pins located in the flange 15 and then through the axially extending apertures in the flange 16, where, after tensioning, they are secured by tightening the grub screws. The wires could alternatively be tensioned with springs as shown in the prior art.

Mounted immediately above the roll 5 is a hardened steel roll 20 having reduced diameter ends so as to leave a central land 21. The roll 20 is carried on stub shafts 22 rotatably mounted in vertically slidable bearing blocks 23. The bearing blocks 23 are formed with slideway grooves 26 and are mounted for vertical sliding movement in the slideways 3 of the frames 2, and are connected by piston rods 24 to pneumatic piston and cylinder units 25. The piston and cylinder units 25 are of a conventional kind. Appropriate control of air pressure facilitates raising or lowering of the roll 20 and generation of nip pressure when a nip is formed between the rolls 5 and 20.

Turning now to Figure 3, this shows the essential features of the apparatus of Figures 1 and 2 when in use to form diagonal scored lines on the reverse of a release sheet 30. The sheet 30 is fed through a nip formed between the rotating rolls 20 and 5 at which nip pressure is generated by the pneumatic piston and cylinder units 25. As a result, the wires 17 generate diagonal scored lines 31 on the release sheet 30, the scored lines extending across a width corresponding to the width of the land 21. Due to the resilience of the layer 11, continuous scored lines of the required depth are formed.

The scoring process can be fine tuned by adjusting the position of the roll 5 with respect to the roll 20 either upstream or downstream to a small extent, e.g. by 1 mm, and/or by skewing the axis of the roll 5 slightly, e.g. by 1 or 2 degrees, relative to the axis of the roll 20. This adjustment is carried out by moving the positions of the bearing blocks 9 in the slideways 4.

It will be apparent that modifications to the embodiment shown may be adopted without departing from the invention.

Claims

1. A method of forming a scored line (31) on a sheet (30) of scorable material comprising the step of passing the sheet (30) through the nip of a pair of contra-rotating rolls (5,20) one of which rolls (20) is an anvil roll having a hard surface and the other of which rolls (5) is a scoring roll having a hard surface with at least one scoring element (17) thereon, said scoring element being a tensioned wire (17), characterised in that the said scoring roll (5) has a resilient surface (11) having a Shore D hardness in the range of 60° to 85° and in that the scoring roll (5) has the said at least one scoring element (17) extending over its resilient surface (11).

2. A method according to claim 1, characterised by the step of applying pressure to the rolls (5, 20) to control the nip.

3. A method according to claim 2, characterised in that the nip force of the rolls (5, 20) lies in the range 313 to 717 Newtons per scoring element (17).

4. A method according to any one of claims 1 to 3 characterised by the step of adjusting the pair of rolls (5, 20) so that the axis of one of them is offset with respect to the axis of the other roll.

5. A method according to any preceding claim, characterised by the step of arranging the hard roll (20) to form a nip only with its central portion (21) so as to leave marginal portions of the sheet (30) unscored.

6. A method according to any preceding claim, characterised by the step of skewing the axes of the pair of rolls (5, 20) relative to one another.

7. A method according to any preceding claim, characterised in that the resilient roll (5) has a helical scoring element (17) wound and tensioned around it.

8. A method of making a laminate for use in making a label or the like from a paper sheet, comprising the steps of applying a liquid release coating to one surface of the paper sheet (30) and drying it thereon, thereafter forming a plurality of weakened reduced thickness score lines (31) in the other surface of the paper sheet by using a method according to any preceding claim, and by laminating a layer of adhesive and a face sheet to said paper sheet (30) with said adhesive layer being intermediate the paper sheet and the face sheet and being bonded to the said one surface of the paper sheet.

9. Apparatus for scoring sheet material comprising a rotatably mounted scoring roll (5) having at least one linear scoring element (17) in the form of a tensioned wire thereon, a co-operating rotatably mounted anvil roll (20) having a hard surface, the rolls (5, 20) forming a nip through which scorable material (30) can be passed for the formation of scored lines (31) thereon, characterised by a resilient surface layer (11) on the scoring roll (5), said resilient surface layer having a Shore D hardness in the range 60° to 85°, and by said at least one linear scoring element (17) extending over the resilient surface layer (11) on said scoring roll (5).

10. Apparatus according to claim 9, characterised in that the linear scoring elements (17) comprise a plurality of tensioned wires in the range 1.1mm to 1.4mm in diameter, extending helically, and in substantially parallel relationship across the resilient surface layer (11).

11. Apparatus according to claim 9 or claim 10, characterised in that the material forming the resilient surface layer (11) is polyurethane.

12. Apparatus according to claim 11, characterised in that the resilient material has a Shore D hardness in the range 70° to 80°.

13. Apparatus according to claim 12, characterised in that the resilient material has a Shore D hardness of about 75°.

14. Apparatus according to any one of claims 9 to 13, characterised in that the rolls (5, 20) are disposed with their axes extending horizontally and with the anvil roll (20) positioned substantially vertically above the scoring roll (5).

15. Apparatus according to any one of claims 9 to 14, characterised in that the axis of the anvil roll (20) is offset from the axis of the scoring roll (5).

16. Apparatus according to any one of claims 9 to 15, characterised in that the anvil roll (20) is formed with a central land (21) which forms the nip with the scoring roll (5) so that scoring is not effected across the full width of the scored web (30).

17. Apparatus according to any one of claims 9 to 16, characterised in that the axis of one roll (5, 20) is skewed with respect to the axis of the other roll (5, 20).

18. Apparatus according to any one of claims 9 to 17, characterised in that the linear scoring elements (17) present a radiused edge.

Patentansprüche

1. Ein Verfahren zum Anbringen einer Falzkerbe (31) auf einem Bogen (30) falzbaren Materials, welches den Arbeitsschritt umfaßt, bei dem der Bogen (30) durch den Spalt zwischen einem Paar gegenläufiger Walzen (5,20) geführt wird, von denen eine Walze (20) eine Amboßwalze mit einer gehärteten Oberfläche ist, und die andere Walze (5) eine Falzwalze mit einer gehärteten Oberfläche mit mindestens einem Falzelement (17) darauf ist, wobei es sich bei dem genannten Falzelement um einen gespannten Draht (17) handelt, gekennzeichnet dadurch, daß die genannte Falzwalze (5) eine flexible Oberfläche (11) mit einem Härtegrad Shore D im Bereich von 60° bis 85° aufweist, und dadurch, daß die Falzwalze (5) mindestens eines der genannten Falzelemente (17) aufweist, welches über ihre flexible Oberfläche (11) hinausragt.

2. Ein Verfahren gemäß Anspruch 1, gekennzeichnet durch den Arbeitsschritt, bei dem zur Regulierung des Spaltes Druck auf die Walzen (5, 20) einwirkt.

3. Ein verfahren gemäß Anspruch 2, gekennzeichnet dadurch, daß die Quetschkraft der Walzen (5, 20) im Bereich von 313 bis 717 Newton pro Falzelement (17) liegt.

4. Ein Verfahren gemäß einem der Ansprüche 1 bis 3, gekennzeichnet durch den Arbeitsschritt, bei dem Walzenpaar (5,20) so justiert wird, daß die Achse der einen Walze bezüglich der Achse der anderen Walze versetzt wird.

5. Ein Verfahren gemäß einem der vorstehend genannten Ansprüche, gekennzeichnet durch den Arbeitsschritt, bei dem die Hartwalze (20) so angeordnet wird, daß sie nur mit ihrem mittleren Quetschteil (21) einen Spalt bildet, und der Rand des Bogens (30) nicht eingekerbt wird.

6. Ein Verfahren gemäß einem der vorstehend genannten Ansprüche, gekennzeichnet durch den Arbeitsschritt, bei dem die Achsen des Walzenpaares (5,20) zueinander schräggestellt werden.

7. Ein Verfahren gemäß einem der vorstehend genannten Ansprüche, gekennzeichnet dadurch, daß um die flexible Walze (5) ein spiralförmiges Falzelement gewickelt und gespannt ist.

8. Ein Verfahren zur Herstellung eines für die Produktion eines Etikettes oder ähnlichem geeigneten Laminats aus einem Bogen Papier, welches die Arbeitsschritte umfaßt, bei denen auf eine Oberfläche des Papierbogens (30) eine flüssige Releaseschicht aufgetragen und auf diesem getrocknet wird, danach unter Verwendung eines Verfahrens gemäß einem der vorstehend genannten Ansprüche auf der anderen Oberfläche des Papierbogens eine Vielzahl von flexiblen Falzkerben mit geringerer Materialstärke (31) angebracht wird, und eine Klebeschicht und eine Außen- oder Kaschierlage auf den genannten Papierbogen (30) aufgetragen werden, wobei sich die genannte Klebeschicht zwischen dem Papierbogen und der Außenschicht befindet und mit der genannten einen Oberfläche des Papierbogens verbindet.

9. Vorrichtung zum Einkerben von Bogenmaterial, bestehend aus einer drehbar gelagerten Falzwalze (5) mit mindestens einem auf dieser

befindlichen linearen Falzelement (17) in Form eines gespannten Drahtes, einer mit dieser zusammenwirkenden drehbar gelagerten Amboßwalze (20) mit einer gehärteten Oberfläche, den Walzen (5,20), welche einen Spalt bilden, durch den verarbeitungsfähiges Material (30) zum Zweck des Anbringens von Falzkerben (31) geführt werden kann, gekennzeichnet durch eine flexible Oberflächenschicht (11) auf der Falzwalze (5), wobei die Genannte flexible Oberfläche einen Härtegrad Shore D im Bereich von 60° bis 85° bat, und durch mindestens eines der genannten linearen Falzelemente (17), welches über die flexible Oberflächenschicht (11) auf der genannten Falzwalze (5) hinausragt.

10. Vorrichtung gemäß Anspruch 9, gekennzeichnet dadurch, daß die linearen Falzelemente (17) eine Vielzahl von gespannten Drähten mit einem Durchmesser von 1,1 mm bis 1,4 mm aufweisen, welche spiralförmig und im wesentlichen parallel zueinander über die flexible Oberflächenschicht (11) verlaufen.

11. Vorrichtung gemäß Anspruch 9 oder Anspruch 10, gekennzeichnet dadurch, daß es sich bei dem Material für die flexible Oberflächenschicht (11) um Polyurethan handelt.

12. Vorrichtung gemäß Anspruch 11, gekennzeichnet dadurch, daß das flexible Material einen Härtegrad Shore D von 70° bis 80° aufweist.

13. Vorrichtung gemäß Anspruch 12, gekennzeichnet dadurch, daß das flexible Material einen Härtegrad Shore D von ungefähr 75° hat.

14. Vorrichtung gemaß einem der Ansprüche 9 bis 13, gekennzeichnet dadurch, daß die Walzen (5, 20) so angeordnet sind, daß ihre Achsen horizontal verlaufen, und sich die Amboßwalze (20) im wesentlichen vertikal oberhalb der Falzwalze (5) befindet.

15. Vorrichtung gemäß einem der Ansprüche 9 bis 14, gekennzeichnet dadurch, daß die Achse der Amboßwalze (20) bezüglich der Achse der Falzwalze (5) versetzt ist.

16. Vorrichtung gemäß einem der Ansprüche 9 bis 15, gekennzeichnet dadurch, daß die Amboßwalze (20) ein mittleres Quetschteil (21) aufweist, welches mit der Falzwalze (5) den Spalt bildet, so daß die Einkerbung nicht über die volle Breite des zu einzukerbenden Materials (30) erfolgt.

17. Vorrichtung gemäß einem der Ansprüche 9 bis 16, gekennzeichnet dadurch, daß die Achse der einen Walze (5, 20) bezüglich der Achse der anderen Walze (5, 20) schräggestellt ist.

18. Vorrichtung gemäß einem der Ansprüche 9 bis 17, gekennzeichnet dadurch, daß die linearen Falzelemente (17) eine gerundete Kante aufweisen.

Revendications

1. Procédé pour réaliser une ligne d'incision (31) dans une feuille (30) de matière, consistant à faire passer la feuille (30) dans l'interstice de serrage d'une paire de rouleaux (5,20) qui tournent en sens opposés, l'un de ces rouleaux (20) jouant le rôle d'enclume et présentant une surface dure, et l'autre rouleau (5) jouant le rôle de rouleau d'incision et présentant une surface dure sur laquelle est disposé au moins un organe d'incision (17) constitué par un fil métallique (17) sous tension, caractérisé en ce que le rouleau d'incision (5) présente une surface élastique (11) ayant une dureté Shore D comprise entre 60° et 85°, et en ce que sur le rouleau d'incision (5) chaque organe d'incision (17) s'étend sur la surface élastique (11) du rouleau.

2. Procédé selon la revendication 1, caractérisé en ce qu'on applique un effort d'appui sur les rouleaux (5,20) afin de contrôler l'interstice de serrage existant entre ces rouleaux.

3. Procédé selon la revendication 2, caractérisé en ce que l'effort de serrage entre les deux rouleaux (5,20) est compris entre 313 et 717 Newtons par organe d'incision (17).

4. Procédé selon l'une des revendications 1 à 3, caractérisé en ce qu'on règle la position des deux rouleaux (5,20) pour décaler l'axe d'un rouleau par rapport à l'axe de l'autre rouleau.

5. Procédé selon l'une des revendications précédentes, caractérisé en ce qu'on aménage le rouleau dur (20) pour que l'interstice de serrage existe seulement en regard de la partie centrale (21) de ce rouleau, afin de laisser intactes, sans incisions, des parties marginales de la feuille à traiter (30).

6. Procédé selon l'une des revendications précédentes, caractérisé en ce que l'on dispose les axes des deux rouleaux (5,20) en biais l'un par rapport à l'autre.

7. Procédé selon l'une des revendications précédentes, caractérisé en ce que le rouleau élastique (5) comporte un organe d'incision (17) disposé en hélice et sous tension autour de ce rouleau.

8. Procédé pour fabriquer une feuille composite laminée destinée à réaliser une étiquette ou un article analogue à partir d'une feuille de papier, comportant les phases opératoires suivantes: on applique sur une face de la feuille de papier (30) un enduit liquide anti-adhésif, et on sèche cet enduit sur la feuille, après quoi on opère suivant le procédé défini par l'une quelconque des revendications précédentes pour pratiquer sur l'autre face de la feuille de papier (30) une série de lignes d'incision (31) à l'endroit desquelles le papier est affaibli par réduction d'épaisseur, et on applique par laminage sur la feuille de papier (30) une couche d'adhésif et une feuille de façade, cette couche d'adhésif se trouvant disposée entre la feuille de papier et la feuille de façade, et fixée par collage provisoire à la face de la feuille de papier précédemment traitée avec l'enduit anti-adhésif.

9. Dispositif pour réaliser des incisions dans une feuille de matière, comportant un rouleau d'incision (5) monté rotativement et pourvu d'au moins un organe d'incision linéaire (17) constitué par un fil métallique tendu disposé sur ce rouleau, un rouleau-enclume (20) pourvu d'une surface dure, monté rotativement et prévu pour coopérer avec le premier rouleau (5), un interstice de serrage étant réalisé entre les deux rouleaux (5,20) pour le passage d'une feuille de matière appropriée (30) sur laquelle on veut réaliser des lignes d'incision (31), caractérisé en ce que le rouleau d'incision (5) comporte superficiellement une couche de matière élastique ayant une dureté comprise entre 60° et 85° Shore D, et en ce que chaque organe d'incision linéaire (17) s'étend sur toute la couche élastique (11) prévue à la surface du rouleau d'incision (5).

10. Dispositif selon la revendication 9, caractérisé en ce que les organes linéaires d'incision (17) sont constitués par une série de fils métalliques ayant un diamètre de 1,1 à 1,4 mm, montés sous tension, sensiblement parallèles entre eux, et s'étendant hélicoïdalement en travers de la couche surperficielle de matière élastique (11).

11. Dispositif selon l'une des revendications 9 ou 10, caractérisé en ce que la couche superficielle de matière élastique (11) est constituée de polyuréthane.

12. Dispositif selon la revendication 11, caractérisé en ce que la matière élastique présente une dureté Shore D comprise entre 70° et 80°.

13. Dispositif selon la revendication 12, caractérisé en ce que la matière élastique présente une dureté Shore D d'environ 75°.

14. Dispositif selon l'une des revendications 9 à 13, caractérisé en ce que les axes des rouleaux (5,20) sont disposés horizontalement, le rouleau-enclume (20) étant placé sensiblement à la verticale au-dessus du rouleau d'incision (5).

15. Dispositif selon l'une des revendications 9 à 14, caractérisé en ce que l'axe du rouleau-enclume (20) est décalé par rapport à l'axe du rouleau d'incision (5).

16. Dispositif selon l'une des revendications 9 à 15, caractérisé en ce que le rouleau-enclume (20) comporte une plage centrale d'appui (21) qui définit l'interstice de serrage formé avec le rouleau d'incision (5) de manière à ne pas effectuer les incisions sur toute la largeur de la feuille à traiter (30).

17. Dispositif selon l'une des revendications 9 à 16, caractérisé en ce que l'axe de l'un des rouleaux (5,20) est disposé en biais par rapport à l'axe de l'autre rouleau (20,5).

18. Dispositif selon l'une des revendications 9 à 17, caractérisé en ce que les organes linéaires d'incision (17) présentent une arête arrondie.

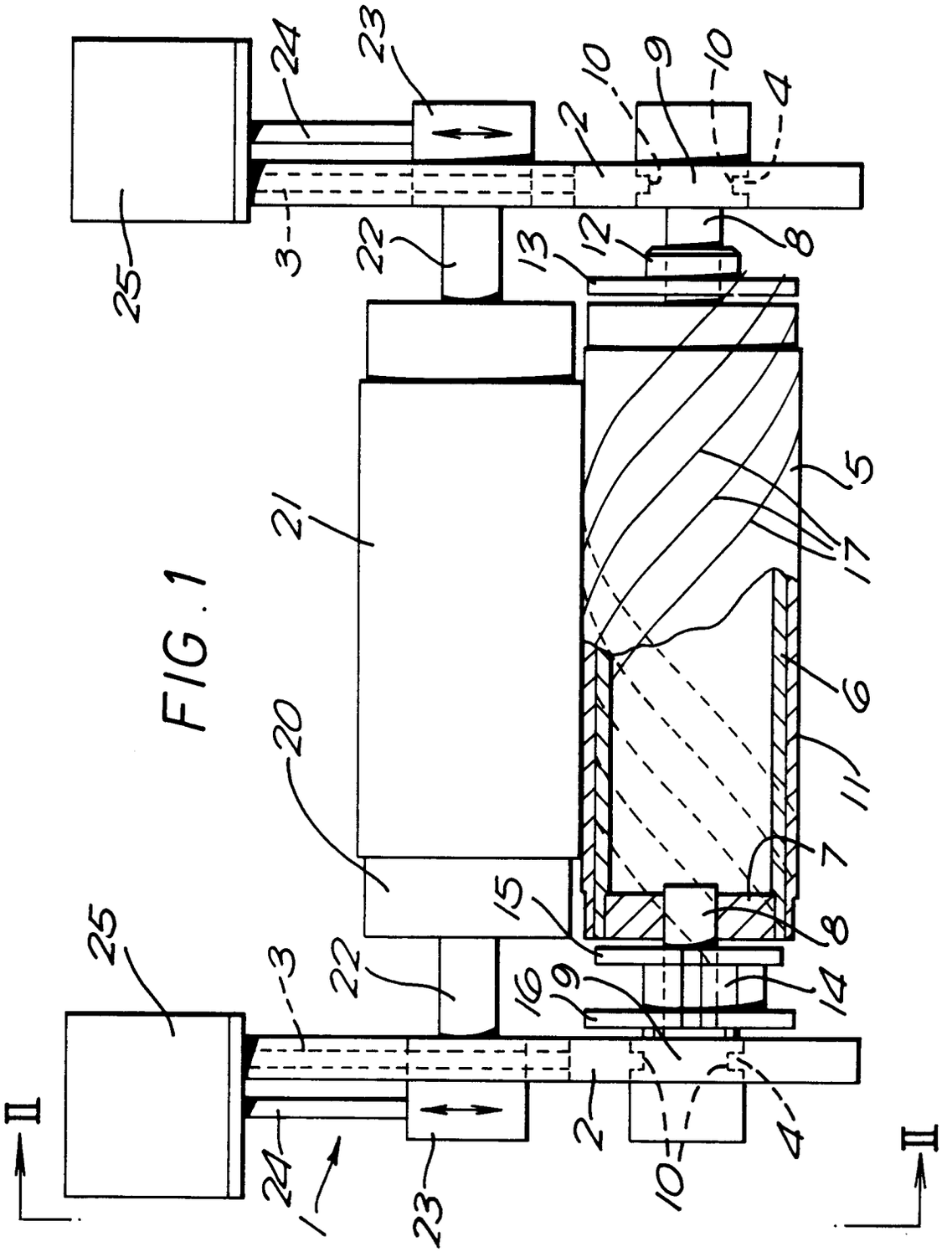
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FIG. 1

FIG. 2

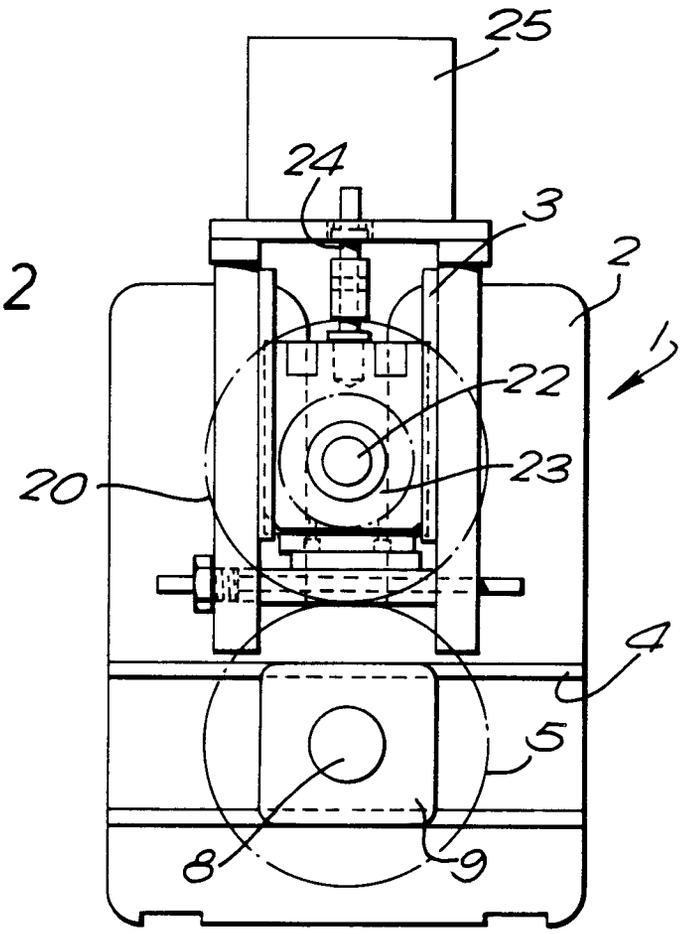
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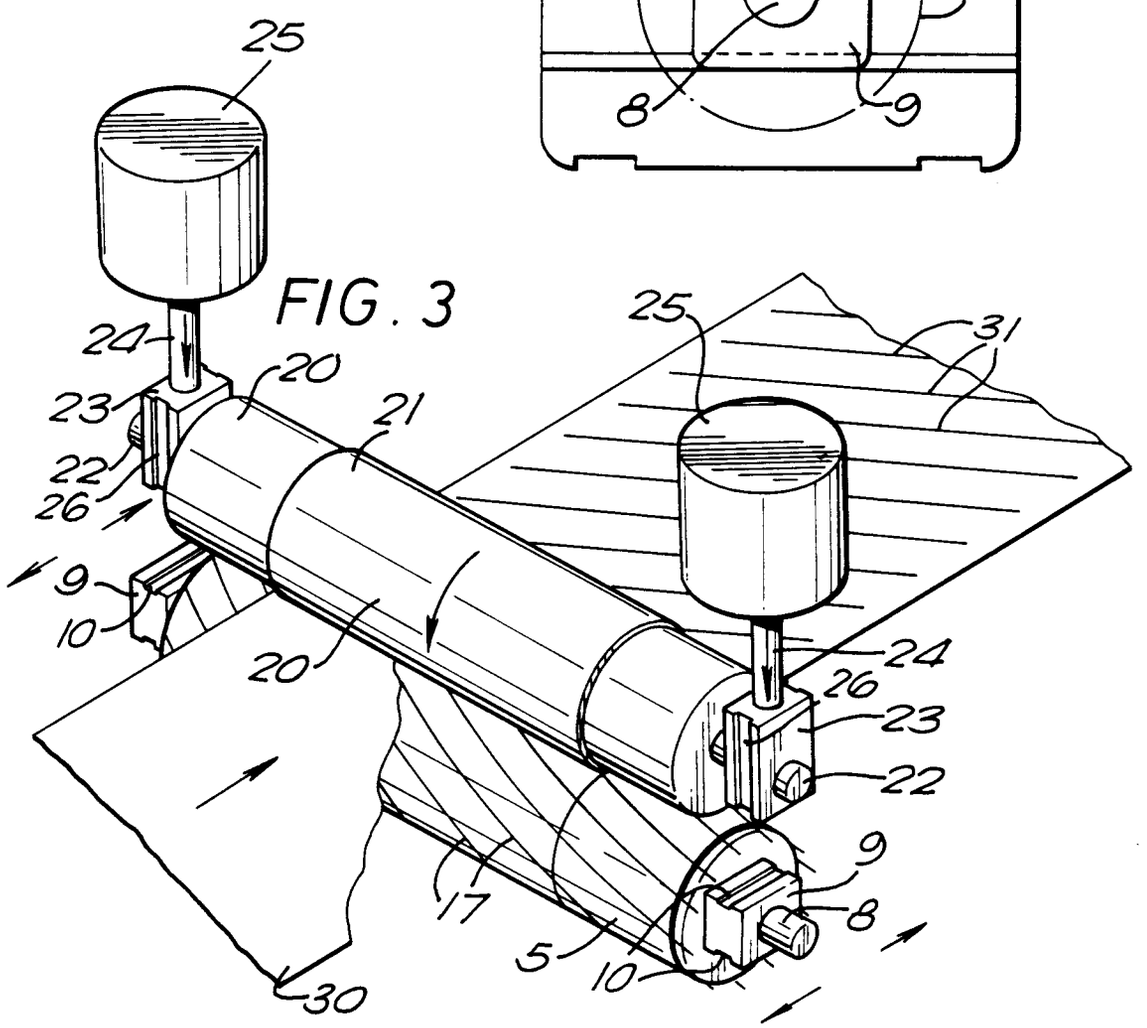
FIG. 3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