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(54) **METHOD OF AND APPARATUS FOR PRODUCING LABELS.**

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Description

The present invention relates to a method of and an apparatus for producing a succession of self-adhesive labels carried on a backing of release material.

It is known, for example from EP-A-0275670, to produce a succession of self-adhesive labels which are carried directly on a backing of release material.

The present invention aims to provide an improved method of and apparatus for producing labels.

Accordingly, the present invention provides a method of producing a succession of self-adhesive labels carried on a backing of release material, the method comprising the steps of:- (a) providing a plurality of printed sheets; (b) feeding the sheets in succession through an adhesive spraying station at which adhesive is sprayed from a spray nozzle onto an exposed surface of each sheet; and (c) adhering the adhesive-coated exposed surface of each of the succession of sheets to a backing of release material, characterised in that prior to feeding step (b) the sheets are electrostatically charged thereby to enhance the coating of adhesive onto the exposed surfaces.

The present invention also provides an apparatus for producing a succession of self-adhesive labels carried on a backing of release material, the apparatus comprising an adhesive spraying station comprising a spray nozzle for spraying adhesive, means for feeding a succession of printed sheets through the adhesive spraying station so that an exposed surface of each sheet is coated with adhesive and means for adhering the adhesive-coated surface of the sheets to a backing for release material, characterised by means for electrostatically charging the sheets before the sheets are fed through the adhesive spraying station.

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic elevation of an apparatus for producing labels in accordance with a first embodiment of the present invention;

Figure 2 is a diagrammatic plan view of the apparatus of Figure 1 along line A-A;

Figure 3 shows a modification of the endless belt of the apparatus of Figures 1 and 2; and

Figure 4 is a diagrammatic elevation of an apparatus for producing labels in accordance with a second embodiment of the present invention.

Referring to Figures 1 and 2, an apparatus, designated generally as 2, for producing a succession of self-adhesive labels carried on a release backing material includes a magazine 4 for holding a stack of printed sheets 6. The sheets 6 may be

single layer or multi-layer sheets and are printed by any suitable printing method, such as lithographic, screen or laser printing. A sheet feeding mechanism 8 is located above the stack of sheets 6 and is adapted to feed from the magazine 4 a succession of sheets 6 from the top of the stack. The sheet feeding mechanism 8 is represented as a rotatable drive cylinder but may alternatively comprise any suitable known sheet feeding mechanism. The sheets are fed in succession past an electrostatic charging device 10 which is adapted to apply an electrostatic charge of a given polarity across the upper surface of the sheets 6. When the sheets 6 are made of paper, this charge is retained evenly over the sheets 6. If desired, the electrostatic charging device 10 may be omitted when the sheet feeding mechanism 8 is adapted to feed sheets from the stack in such a way that the fed sheets have an electrostatic charge. The sheets are fed by the sheet feeding mechanism 8 onto a vacuum drive means incorporating a vacuum conveyor 12 which comprises an endless belt 14 mounted between a pair of drive rollers 16. The surface of the endless belt 14 is provided with a series of holes 18 and the space 20 between the opposed inner surfaces of the endless belt 14 is connected to a source of suction. As the sheets 6 are deposited onto the vacuum conveyor 12 the bottom surface 22 of each sheet is sucked through the holes 18 against the upper surface 24 of the endless belt 14. This ensures that each sheet 6 is firmly located on the vacuum conveyor 12.

The vacuum conveyor 12 conveys the succession of sheets 6 through an adhesive spraying station 26 comprising a spray nozzle 28 for spraying a coating of adhesive 30 onto the exposed upper surface 32 of each sheet 6 passing through the adhesive spraying station 26. In the preferred embodiment, the spray nozzle 28 is adapted to spray electrostatically charged droplets of adhesive onto the exposed surfaces 32. This may be effected by feeding electrostatic charge from a source of electric power to the spray nozzle 28, the charge being of opposite polarity to that which is applied by the electrostatic charging device 10. The adhesive may be a water-or solvent-based pressure-sensitive adhesive or alternatively a heat-sealable pressure-sensitive adhesive.

The succession of sheets 6 coated with adhesive 30 is then fed by the vacuum conveyor 12 to a laminating station 34 comprising a pair of opposed rollers 36, 38 between which the succession of sheets 6 is laminated to a backing 40 of release material, the laminating being achieved by adhering the adhesive-coated surface 32 of each sheet 6 to the backing 40 of release material. The backing 40 of release material is fed out from a reel 42 thereof and typically comprises a wax-or silicone-

coated paper. The adhesive coating 30 is urged against the backing 40 of release material and then the combined assembly passes over an idle roller 44 and is then wound up on a take-up reel 46 of the succession of self-adhesive labels 6 on the backing 40 of release material.

In the illustrated arrangement, the sheets 6 are conveyed through the adhesive spraying station 26 in spaced relation. The spraying nozzle 28 may be operated either continuously or intermittently in synchronism with the disposition thereunder of a sheet 6 to be sprayed with adhesive. A washing and cleaning mechanism 48 is disposed in contact with the endless belt 14 for cleaning excess adhesive 30 off the outer surface of the endless belt 14.

If desired, the apparatus may also comprise a slitting mechanism at, or downstream of, the laminating station 34 at which the backing 40 of release material and the succession of sheets 6 adhered thereto are longitudinally slit so as to provide two adjacent reels 46 of the self-adhesive labels carried on the backing of release material. With this arrangement, each printed sheet 6 would have a pair of identical images printed thereof transversely adjacent to each other.

As shown in Figure 3, the endless belt 14 may be modified by the provision thereon of a succession of raised pads 58. In use the sheet feeding mechanism 8 feeds the sheets 6 so that each sheet lies on a respective pad 58 above the surface 60 of the endless belt 14. This assists the application of adhesive to the sheets 6 and ensures that those parts of the endless belt 14 which receive extraneous adhesive do not actually contact the edges of the sheets 6.

A second embodiment of an apparatus for producing labels in accordance with the present invention is shown in Figure 4. This embodiment is a modification of that shown in Figures 1 and 2 and like parts are identified by like reference numerals. In this embodiment, the vacuum conveyor 50 comprises a vacuum cylinder 52 which is hollow and the cylindrical surface of which is provided with an array of holes (not shown). The cylindrical void in the centre of the vacuum cylinder is connected to a source of suction. The sheets 6 are fed out from the stack thereof by the sheet feeding mechanism 8. The bottom surface 22 of each sheet 6 engages the upper surface of the printing cylinder 52 which is rotatably driven and conveys the sheet 6 through the adhesive spraying station 26 to the laminating station 34. The adhesive spraying station 26 is additionally provided with a pair of shields 54, 56 which are located on upstream and downstream sides, in relation to the direction of feeding of the sheets 6, of the spray nozzle 28. The shields 54, 56 are arranged so as to control the application of the spray of adhesive 30 to within defined bound-

aries. If desired, the operation of the spray nozzle 28 is controlled so as to be intermittently synchronized with the location of a sheet 6 between the shields 54, 56.

As with the first illustrated embodiment, the apparatus may be modified by the addition thereto of a slit for longitudinally slitting the assembly of self-adhesive labels carried on the release material. The apparatus may additionally be provided with a downstream inspection station at which the assembly of self-adhesive labels on the reel of release backing material can be inspected.

In each of the two illustrated embodiments, the electrostatic charge initially on the sheets as they enter the adhesive spraying station is either neutralised by the application of the adhesive or dissipated at, or downstream of, the adhesive spraying station as a result of contact of the sheets with other parts of the apparatus. In the resultant reel of self-adhesive labels, there is no substantial electrostatic charge.

Claims

1. A method of producing a succession of self-adhesive labels carried on a backing of release material, the method comprising the steps of:-
 - (a) providing a plurality of printed sheets (6);
 - (b) feeding the sheets (6) in succession through an adhesive spraying station (26) at which adhesive is sprayed from a spray nozzle (28) onto an exposed surface of each sheet (6); and
 - (c) adhering the adhesive-coated exposed surface (32) of each of the succession of sheets (6) to a backing (40) of release material,
 characterised in that prior to feeding step (b) the sheets (6) are electrostatically charged thereby to enhance the coating of adhesive (30) onto the exposed surfaces.
2. A method according to claim 1 wherein the spray nozzle (28) is adapted to spray electrostatically charged droplets of adhesive onto the exposed surfaces.
3. A method according to claim 1 wherein in adhering step (c) the succession of sheets (6) and the backing (40) of release material are laminated together between a pair of opposed rollers (36,38).
4. A method according to any foregoing claim wherein the succession of sheets (6) is fed through the adhesive applying station (26) by a vacuum drive means which employs suction to

suck a surface of each sheet which is remote from the spray nozzle (28) against a vacuum conveyor (12,50).

5. A method according to claim 4 wherein the vacuum conveyor (12,50) comprises an endless belt (14) mounted between a pair of drive rollers (16). 5
6. A method according to claim 4 wherein the vacuum conveyor comprises a vacuum cylinder (50). 10
7. An apparatus for producing a succession of self-adhesive labels carried on a backing of release material, the apparatus comprising an adhesive spraying station (26) comprising a spray nozzle (28) for spraying adhesive, means (8) for feeding a succession of printed sheets through the adhesive spraying station (26) so that an exposed surface of each sheet (6) is coated with adhesive and means for adhering the adhesive-coated surface (30) of the sheets to a backing (40) for release material, characterised by means (10) for electrostatically charging the sheets (6) before the sheets (6) are fed through the adhesive spraying station (26). 15 20
8. An apparatus according to claim 7 wherein the spray nozzle (28) is adapted to spray electrostatically charged droplets of adhesive onto the exposed surfaces. 25 30
9. An apparatus according to claim 7 wherein the adhering means comprises a pair of opposed rollers (36,38) between which the succession of sheets (6) and the backing (40) of release material are laminated. 35
10. An apparatus according to any one of claims 7 to 9 wherein the feeding means includes a vacuum drive means which employs suction to suck a surface of each sheet (6) which is remote from the spray nozzle (28) against a vacuum conveyor (12,50) of the drive means. 40 45
11. An apparatus according to claim 10 wherein the vacuum (12,50) conveyor comprises an endless belt (14) mounted between a pair of drive rollers (16). 50
12. An apparatus according to claim 10 wherein the vacuum conveyor comprises a vacuum cylinder (50). 55

Patentansprüche

1. Verfahren zum Herstellen einer Folge von selbstklebenden Etiketten, die auf einer Unterlage von Abziehmaterial getragen werden, wobei das Verfahren die folgenden Schritte umfaßt:
 - (a) Bereitstellen einer Anzahl von bedruckten Blättern (6);
 - (b) Zuführen der Blätter (6) in Folge durch eine Klebstoffsprühstation (26), in der Klebstoff aus einer Sprühdüse (28) auf eine freiliegende Oberfläche jedes Blattes (6) aufgesprüht wird; und
 - (c) Aufkleben der mit Klebstoff beschichteten freiliegenden Oberfläche (32) jedes Blattes (6) der Folge auf eine Unterlage (40) von Abziehmaterial,
 dadurch gekennzeichnet, daß vor dem Zuhrschritt (b) die Blätter (6) elektrostatisch aufgeladen werden, um dadurch das Aufschichten des Klebstoffs (30) auf die freiliegenden Oberflächen zu verbessern.
2. Verfahren nach Anspruch 1, bei welchem die Sprühdüse (28) geeignet ist, elektrostatisch geladene Tröpfchen von Klebstoff auf die freiliegenden Oberflächen zu sprühen.
3. Verfahren nach Anspruch 1, bei welchem im Aufklebschritt (c) die Folge von Blättern (6) und die Unterlage (40) aus Abziehmaterial zwischen einem Paar von gegenüberliegenden Rollen (36,38) aufeinandergeschichtet werden.
4. Verfahren nach einem der vorangehenden Ansprüche, bei welchem die Folge von Blättern (6) durch die Klebstoffaufsprühstation (26) durch eine Vakuumantriebseinrichtung gefördert wird, welche einen Sog anwendet, um eine Oberfläche jedes Blattes, die von der Sprühdüse (28) entfernt ist, gegen einen Vakuumförderer (12,50) zu saugen.
5. Verfahren nach Anspruch 4, bei welchem der Vakuumförderer (12,50) ein Endlosband (14) aufweist, das zwischen einem Paar von Antriebsrollen (16) gehalten wird.
6. Verfahren nach Anspruch 4, bei welchem der Vakuumförderer einen Vakuumzylinder (50) aufweist.
7. Vorrichtung zum Herstellen einer Folge von selbstklebenden Etiketten, welche auf einer Unterlage von Abziehmaterial getragen werden, wobei die Vorrichtung aufweist: eine Klebstoffaufsprühstation (26) mit einer Sprühdüse

- (28) zum Aufsprühen von Klebstoff, eine Einrichtung (8) zum Fördern einer Folge von bedruckten Blättern durch die Klebstoffaufsprühstation (26), so daß eine freiliegende Oberfläche jedes Blattes (6) mit Klebstoff beschichtet wird, sowie eine Einrichtung zum Ankleben der mit Klebstoff beschichteten Oberfläche (30) der Blätter an einer Unterlage (40) von Abziehmaterial, gekennzeichnet durch eine Einrichtung (10) zum elektrostatischen Aufladen der Blätter (6), bevor die Blätter (6) durch die Klebstoffaufsprühstation (26) gefördert werden.
8. Vorrichtung nach Anspruch 7, bei welcher die Sprühdüse (28) geeignet ist, elektrostatisch geladene Tröpfchen von Klebstoff auf die freiliegenden Oberflächen zu sprühen.
9. Vorrichtung nach Anspruch 7, bei welcher die Anklebeinrichtung ein Paar von gegenüberliegenden Rollen (36,38) aufweist, zwischen denen die Folge von Blättern (6) und die Unterlage (40) aus Abziehmaterial aufeinandergeschichtet werden.
10. Vorrichtung nach einem der Ansprüche 7 bis 9, bei welcher die Fördereinrichtung eine Vakuumantriebseinrichtung aufweist, welche Sog anwendet, um eine Oberfläche jedes Blattes (6), die von der Sprühdüse (28) entfernt ist, gegen einen Vakuumpförderer (12,50) der Antriebseinrichtung zu saugen.
11. Vorrichtung nach Anspruch 10, bei welcher der Vakuumpförderer (12,50) ein Endlosband (14) aufweist, das zwischen einem Paar von Antriebsrollen (16) gehalten ist.
12. Vorrichtung nach Anspruch 10, in welcher der Vakuumpförderer einen Vakuumzylinder (50) aufweist.
- feuilles (6) de la suite à une pièce dorsale (40) en matière anti-adhérente, caractérisé en ce que, avant l'étape (b) d'avance, les feuilles (6) reçoivent une charge électrostatique afin de renforcer l'enduction d'adhésif (30) sur les surfaces à découvert.
2. Procédé selon la revendication 1, dans lequel la buse (28) de pulvérisation est conçue pour pulvériser des gouttelettes d'adhésif, chargées électrostatiquement, sur les surfaces à découvert.
3. Procédé selon la revendication 1, dans lequel, dans l'étape (c) d'adhérence, la suite de feuilles (6) et la pièce dorsale (40) en matière anti-adhérente sont stratifiées l'une à l'autre entre deux rouleaux opposés (36, 38).
4. Procédé selon l'une quelconque des revendications précédentes, dans lequel la suite de feuilles (6) est avancée à travers le poste (26) d'application d'adhésif par des moyens d'entraînement par vide qui utilisent une aspiration pour appliquer par aspiration une surface de chaque feuille, qui est éloignée de la buse (28) de pulvérisation, contre un transporteur à vide (12, 50).
5. Procédé selon la revendication 4, dans lequel le transporteur (12, 50) à vide comporte une bande sans fin (14) montée entre deux rouleaux d'entraînement (16).
6. Procédé selon la revendication 4, dans lequel le transporteur à vide comporte un cylindre à vide (50).
7. Appareil pour produire une suite d'étiquettes auto-collantes portées sur une pièce dorsale en matière anti-adhérente, l'appareil comportant un poste (26) de pulvérisation d'adhésif comportant une buse (28) de pulvérisation destinée à pulvériser un adhésif, des moyens (8) destinés à faire avancer une suite de feuilles imprimées à travers le poste (26) de pulvérisation d'adhésif afin qu'une surface à découvert de chaque feuille (6) soit revêtue d'un adhésif, et des moyens pour faire adhérer la surface (30), revêtue d'adhésif, des feuilles à une pièce dorsale (40) en matière anti-adhérente, caractérisé par des moyens (10) destinés à appliquer une charge électrostatique aux feuilles (6) avant que celles-ci soient avancées à travers le poste (26) de pulvérisation d'adhésif.
8. Appareil selon la revendication 7, dans lequel la buse (28) de pulvérisation est conçue pour

Revendications

1. Procédé de production d'une suite d'étiquettes auto-collantes portées sur une pièce dorsale en matière anti-adhérente, le procédé comprenant les étapes qui consistent :
- (a) à utiliser plusieurs feuilles imprimées (6) ;
- (b) à faire avancer les feuilles (6) les unes à la suite des autres à travers un poste (26) de pulvérisation d'adhésif dans lequel un adhésif est pulvérisé à partir d'une buse (28) de pulvérisation sur une surface à découvert de chaque feuille (6) ; et
- (c) à faire adhérer la surface à découvert (32), revêtue d'adhésif, de chacune des

pulvériser des gouttelettes d'adhésif, chargées électrostatiquement, sur les surfaces à découvrir.

9. Appareil selon la revendication 7, dans lequel les moyens d'adhérence comprennent deux rouleaux opposés (36, 38) entre lesquels la suite de feuilles (6) et la pièce dorsale (40) en matière anti-adhérente sont stratifiées. 5
10. Appareil selon l'une quelconque des revendications 7 à 9, dans lequel les moyens d'avance comprennent des moyens d'entraînement à vide qui utilisent une aspiration pour appliquer par aspiration une surface de chaque feuille (6), qui est éloignée de la buse (28) de pulvérisation, contre un transporteur (12, 50) à vide des moyens d'entraînement. 10 15
11. Appareil selon la revendication 10, dans lequel le transporteur (12, 50) à vide comporte une bande sans fin (14) montée entre deux rouleaux d'entraînement (16). 20
12. Appareil selon la revendication 10, dans lequel le transporteur à vide comporte un cylindre à vide (50). 25

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