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2,946,370

TRANSFERRING PRESSURE SENSITIVE MASS

Filed May 22, 1957

2 Sheets-Sheet 1

Fig. 1.

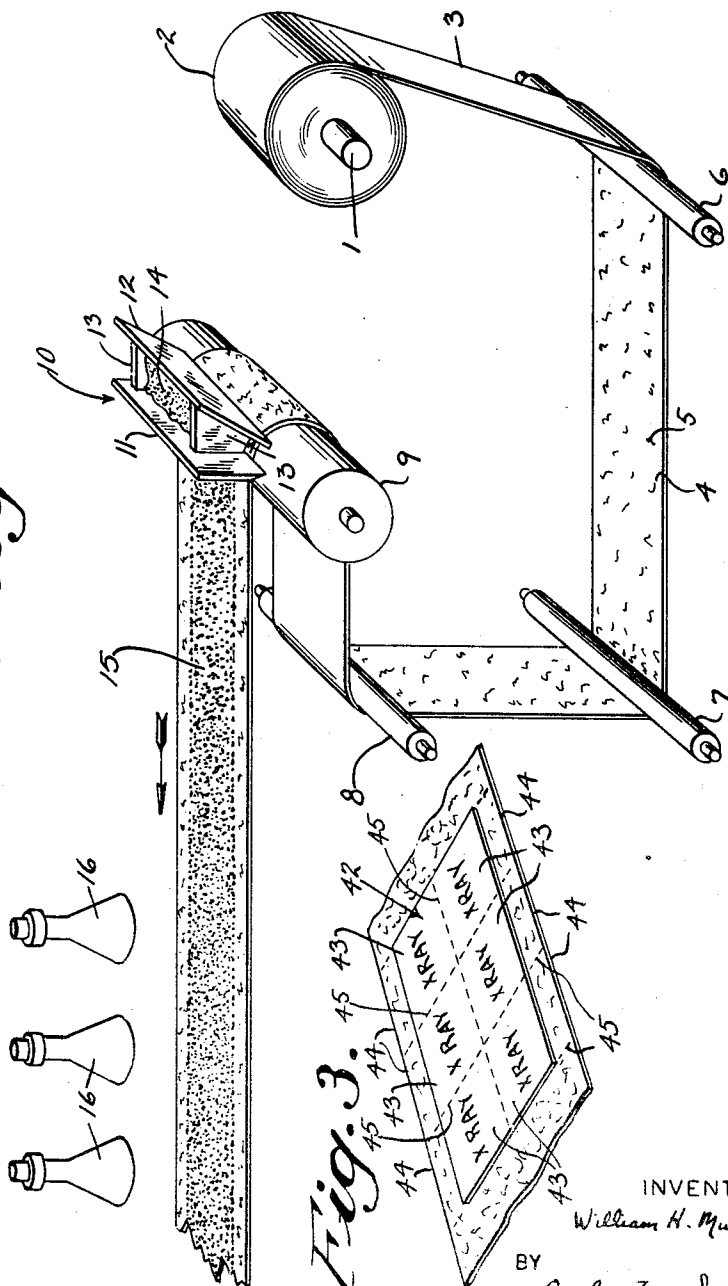
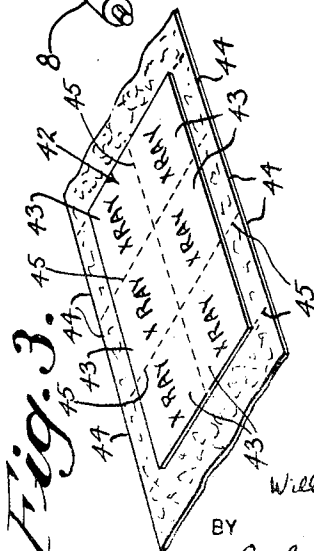


Fig. 3.



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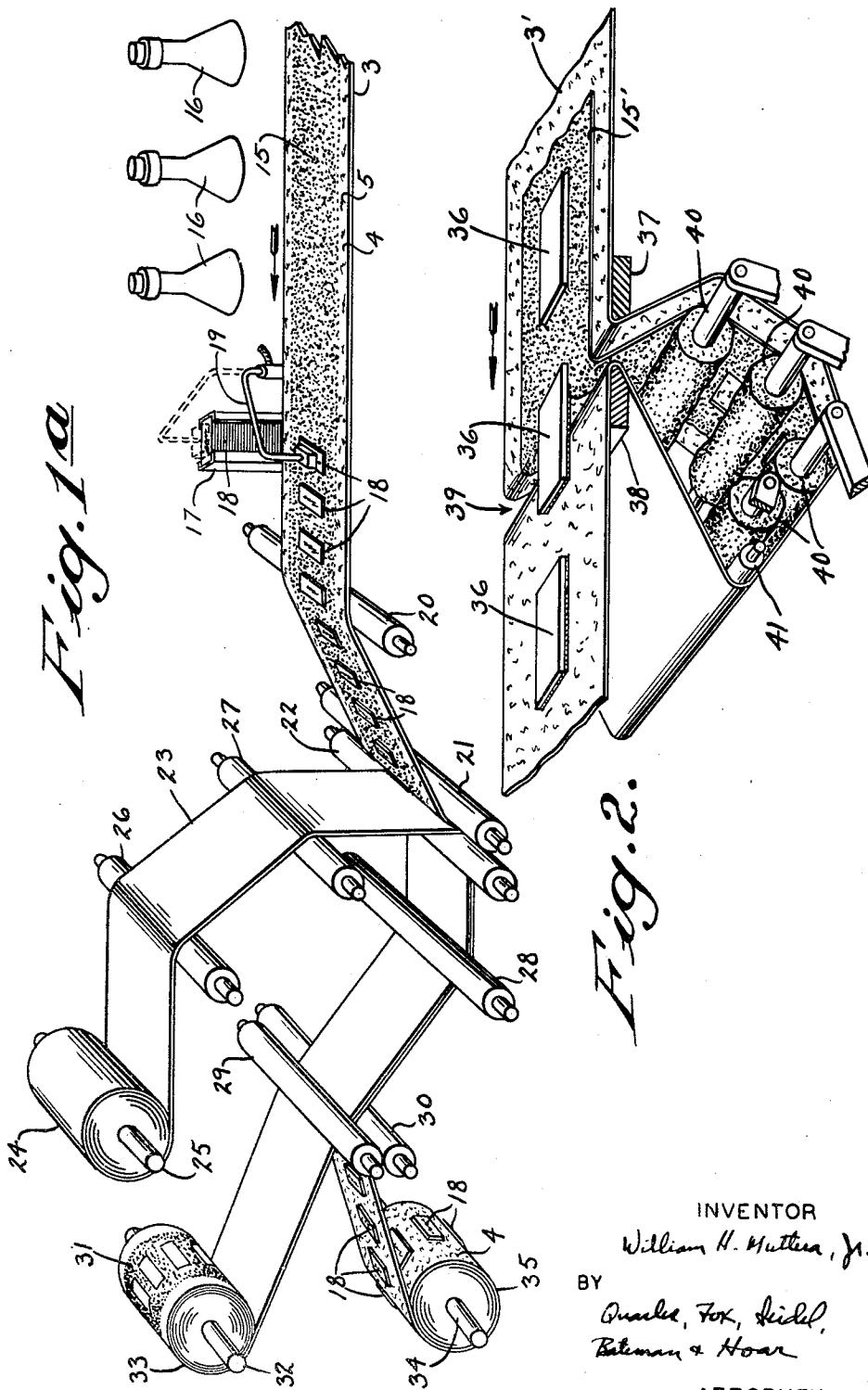
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TRANSFERRING PRESSURE SENSITIVE MASS

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9 Claims. (Cl. 154-1.6)

This invention relates to the application of adhesive to surface areas wherein an adhesive mass is first spread upon a web as a pressure sensitive film, the surface areas to which the adhesive is to be transferred are then placed upon the web with the bond between these areas and the adhesive being greater than that between the web and adhesive, whereby upon removal of the surfaces from the web the adhesive separates with the surfaces from the web, and as a further contemplation of the invention the excess adhesive to the sides of the surface areas may be removed from the web to thereby provide an assembly wherein adhesive backed material may readily be handled before application.

The application of pressure sensitive adhesive masses to thin pliant articles, such as fabric labels and masks, is most advantageously carried out by coating the material, from which such labels or masks are to be formed, with the adhesive while in roll stock. An adhesive film may readily be applied to a continuous web at low cost by the use of roll coaters, fountain spreaders, or like equipment. The adhesive is thus applied as a preliminary step, and the individual labels or masks are die cut into individual pieces as a subsequent step in manufacture.

In a variety of instances articles to be coated with an adhesive film do not lend themselves to the method of adhesive application discussed above. For example, stiff articles of considerable thickness cannot be handled in roll or sheet form, nor can numerous articles that must be subdivided from one another as a preliminary step to a chemical treatment or a printing process which cannot tolerate the presence of an adhesive. In the instance of metallic labels cut from sheet stock, such as roll aluminum, it is customary to manufacture the labels in individual form. Where such labels are to be applied to a surface by an adhesive, rather than by mechanical attachment, it has heretofore been customary to apply the adhesive through a process requiring individual handling of the labels. Such a mode of manufacture is costly and time consuming, with the result that the use of adhesive coated metallic articles has been restricted.

In the present invention adhesive may be applied as a film to individual articles in a manner that eliminates individual handling. As a preliminary step, adhesive is spread as a layer upon a flexible web, the surface of which is conditioned to have a lesser degree of adherence with the adhesive than other surfaces which will subsequently come in contact with the adhesive. The articles, to which the adhesive is ultimately transferred, are then placed upon the adhesive coated web. The adherence of the adhesive to the articles is greater than to the web, and upon a subsequent separation of the articles from the web the adhesive attached to the articles is cleanly severed from the web. In instances where the articles are sufficiently thin and flexible the web may be wound into a roll with the articles still in adherent contact therewith. As a step preliminary to such winding into roll

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form the exposed adhesive on the surface of the web, which is not masked by the articles, is removed by offsetting to another surface. Then the web and articles, which are still in adherent contact with the web, are wound into rolls whereby the web becomes a dispensing sheet that facilitates storage, transport and use.

A continuous operation is provided for the transfer of adhesive masses to articles that are, in later use, to be attached to surfaces through the medium of pressure sensitive adhesive. Other adhesives may also be employed, such as heat activated adhesives, which may be retained in a tacky state during the process of affixing the adhesive to the articles.

It is an object of this invention to facilitate the handling of articles in the process of applying a coating of an adhesive to a surface thereof.

It is another object of this invention to transfer adhesive masses to surfaces in a manner that reduces the costs of manufacture of adhesive coated articles.

It is another object of this invention to transfer a tacky adhesive to a plurality of articles that are individual and separate from one another prior to the transfer.

It is another object of this invention to provide a plurality of individual separate articles, spaced from one another, upon a web in which the articles are coated with a pressure sensitive permanently tacky adhesive that temporarily adheres them to the web, to thereby present the articles in a packaged form that facilitates dispensing at the place of use.

The foregoing and other objects and advantages of this invention will appear from the description to follow. In the description reference is made to the accompanying drawings, which form a part hereof, and in which there is shown by way of illustration and not of limitation specific means for the practice of this invention.

In the drawings:

Fig. 1 is a schematic view in perspective of a portion of an apparatus utilized in the practice of this invention,

Fig. 1a is a schematic view in perspective of the remaining portion of an apparatus utilized in the practice of the invention, which together with the apparatus of Fig. 1 completes the representation of a specific apparatus and means for carrying out the invention,

Fig. 2 is a schematic view in perspective of an alternative apparatus for the removal of adhesive from a web, and

Fig. 3 is a view in perspective of a particular form of article manufactured in accordance with the invention.

Referring now to the drawings, there is shown in Fig. 1 a rotatable supply spool 1 that carries a supply roll 2 of liner paper from which a web 3 is withdrawn. The surface 4 of the web 3 has been treated with what is termed, in the industry, a release coating 5. A release coating materially reduces the affinity which an adhesive will have for the surface, so that a weak adhesive bond results between an adhesive and the release coated surface. An adhesive applied to such a coated surface may be quite readily removed therefrom with a clean separation, and through the medium of the use of such a release coat differing surfaces that are to be brought into contact with a particular adhesive mass will have different degrees of adherence with the adhesive, so that a selective process for adhering the adhesive to one of two surfaces with which it is simultaneously brought in contact may be had, as described herein. The release coating is applied as a liquid in a preliminary preparation of the liner paper constituting the roll 2, and a non-migratory silicone type release agent as commercially available may be used. The coating 5 constitutes a film approximately one-half mill in thickness, and the liner paper forming the web 3 is selected from a stock that is dense and non-

absorbent, so that the coating 5 will stand on the surface as a uniform film. A parchment paper is a typical example of that which may be employed for the purpose of this invention.

The web 3 is led about a guide roll 6 and hence about a second guide roll 7, from which it leads upwardly about a third roll 8. From the roll 8 the web 3 passes horizontally toward and about a resilient fountain roll 9, formed of a rubber or similar material.

An adhesive fountain 10 is disposed directly above a fountain roll 9, and comprises a vertically disposed doctor blade 11, a back plate 12, and a pair of side dams 13. The adhesive fountain 10 is spaced in close adjacency to the surface of the fountain roll 9 and the web 3 is drawn between the slight gap separating the fountain 10 from the roll 9.

In the particular example set forth in Figs. 1 and 1a, a pressure sensitive adhesive 14 carried in a volatile vehicle is deposited in the fountain 10, and as the release coated surface 4 of the web 3 is drawn underneath and past the fountain 10 the adhesive is deposited upon the release coated surface 4. Proper metering of the adhesive 14 is had by adjustment of the doctor blade 11. A typical commercially available adhesive has been employed in the practice of the invention and is described as a polyvinyl ethyl ether in a suitable volatile vehicle together with a tackifier and a filler as deemed appropriate.

The web 3 is drawn from the fountain roll 9 with its adhesive layer 15 toward and beneath a bank of radiant heat lamps 16, a number of which are represented in Figs. 1 and 1a. Heat drives the volatile vehicle from the layer of adhesive, so that the adhesive 15 "sets up" upon the release coated surface 4 as a permanently tacky pressure sensitive layer. In a typical practice of the invention the adhesive layer may be approximately 1.5 to 2 mills thick when dry, and the drying may comprise subjection to a temperature of 200 degrees F. or one and a half to two minutes.

The apparatus shown in Figs. 1 and 1a is a single complete apparatus, such that that which is set forth in Fig. 1a is a continuation of that set forth in Fig. 1. Hence, the web 3 shown in Fig. 1a is a continuation of the web 3 of Fig. 1, and as the web 3 emerges from beneath the bank of heat lamps 16 it passes alongside a hopper 17 containing a plurality of articles constituting thin separate individual metallic labels 18. A pneumatic dispenser 19 that transfers labels 18 from the hopper 17 to the adhesive layer 15 is shown schematically. It is within the scope of the practice of this invention to use any of a variety of available feeding mechanisms for placing labels 18 in orderly closely spaced array upon the web 3, and if desired the labels 18 may be deposited by hand upon the adhesive layer 15 of the web 3.

The labels 18 shown in Fig. 1a are quite thin and have a degree of flexibility consistent with preservation of the appearance of the surface. The upper surface may carry marking indicia constituting a label, an identification, or other form of marking. Typical of the labels that may be employed are thin aluminum labels individually cut from roll or sheet stock which have received a surface treatment on the upper exposed face to form marking indicia having a high degree of permanence. The aluminum stock may be of a thickness that permits considerable flexing, but which retains sufficient strength prohibiting tearing or rupturing of the label when it is removed, together with its adhesive backing, from a surface such as that of the web 3, for transfer to another surface upon which it is to be ultimately affixed.

With the labels 18 placed upon the web 3 in an orderly closely spaced array, such that substantially all of the adhesive layer 15 is masked by the labels 18, the web 3 is carried across a roll 20 and hence toward and over a roll 21. From the roll 21 the web 3 progresses to a closely adjacent laminating roll 22 which introduces

a web 23 of transfer paper to the surface 4, to contactingly engage the remaining exposed adhesive 15. The transfer paper is supplied from a roll 24 carried on a spool 25, and is drawn over a pair of idler rolls 26 and 27 to the laminating roll 22. The transfer paper is characterized by having a surface to which the adhesive 15 will readily adhere.

As the transfer paper web 23 is brought into engagement with the web 3 the exposed adhesive 15 temporarily laminates the two webs 3, 23 and these laminated webs 3, 23 are drawn about a guide roll 28 toward and between a pair of squeeze rolls 29 and 30. The squeeze rolls 29, 30 press the webs 3, 23 tightly against one another to insure that the entire area of exposed adhesive 15 is contacted by the transfer paper web 23 under substantial pressure. As the webs 3, 23 are drawn from between the squeeze rolls 29, 30 they are moved in divergent directions so as to split and separate one from the other. The adhesive 15 will have a greater affinity for the surface of the transfer paper web 23 than for the release coated surface 4 of the web 3, whereby the adhesive 15 not covered by the labels 18 will be cleanly separated from the web 3 and carried away with the web 23. The transfer paper together with the transferred adhesive, indicated by the number 31, is wound about a take up spool 32 into a roll 33. The web 3, which no longer has any exposed adhesive layer 15, is wound upon a take up spool 34 into a completed roll of labels 35. The surface 4 of the web 3 either exposes labels 18 or the release coating 5, and as such the roll 35 presents a convenient packaging for the labels 18. Shipment, handling and sale of the labels 18 may be in roll form, which is a form well adapted to the needs of ultimate consumers. The adherent contact of the adhesive 15 for the under surfaces of the labels 18 is of much stronger bond than the bond between the adhesive 15 and the release coated surface 4, so that the labels 18 may readily be stripped from the web 3, when needed, with a clean separation of the adhesive from the web 3, so that the adhesive 15 has been transferred to and become a part of the labels 18. The labels 18 may thus be readily applied to surfaces through the medium of an adhesive bond.

In practicing the invention, the manner of removing the excess, non-utilized adhesive 15 from the surface 4 of the web 3 may be accomplished in the alternative shown in Fig. 2. A release coated web 3' travels to the left from the right-hand side of Fig. 2 and upon the web 3' is an adhesive layer 15', similarly as the layer 15 upon the web 3 in Figs. 1 and 1a. There is disposed upon the adhesive 15' a plurality of articles 36, to which adhesive coatings are to be transferred, and the preparation of the materials as shown at the right side of Fig. 2 is carried out in manner like that of Figs. 1 and 1a. The adhesive 15' has a greater adhesion with the underside of the articles 36 than with the release coated web 3'. The articles 36 are shown with a thickness sufficient to provide a degree of stiffness that will preclude the articles 36 from following an abrupt change in direction of the movement of the web 3'. It is to be understood that the thickness of the articles 36, as well as the configurations thereof, may vary so long as the stiffness is sufficient for the purpose of carrying out the operation now to be described.

The web 3' is passed across the top of the first of a pair of blades 37 and 38, which are closely spaced to one another to leave a gap 39 therebetween. As the web 3' is carried across the blade 37 it is turned sharply down and over the edge thereof, and through the gap 39. As this sharp deviation in the direction of travel occurs an article 36 riding upon the portion of the web 3' turning over the blade 37 separates from the web 3' and crosses the gap 39, to where it recontacts a portion of the web 3' moving upwardly through the gap 39 and turning about the upper side of the blade 38. By reason of

the differential in affinity of the adhesive 15' for the release coated web 3' and the under surface of an article 36 the adhesive which is in contact with the under surface of the article 36 separates from the web 3' and remains as a deposited layer upon the under side of the article 36. Adhesive 15' to the sides of the articles 36, which constitutes the remaining exposed, unused adhesive, is carried down through the gap 39. Thus, there is a separation of the used and unused adhesive 15'.

As the web 3' is led downwardly from the gap 39 it passes about a plurality of adhesive pick-up rolls 40, the surfaces of which contact the adhesive 15'. The adhesive 15' readily adheres to the surfaces of the rolls 40, to thereby offset or pick up the adhesive 15' from the web 3'. As the adhesive 15' is picked up and coats the rolls 40 the collected adhesive 15' presents a surface which itself readily effects a transfer of the adhesive 15' from the web 3'. The cleaned web 3' passes about a guide roll 41, and hence upwardly through the gap 39, from which it emerges to receive the articles 36 as described. The rollers 40 are oscillatably mounted for movement to and from positions contacting the web 3', so that as a roll 40 becomes fully loaded with adhesive it may be moved out of engagement with the web 3' and removed for cleaning. In this fashion one roll may be cleaned, while the others carry on the process.

In instances where the articles to which adhesive is transferred are of substantial size or bulk requiring individual handling, or precluding packaging in a roll form, such as the roll 35 in Fig. 1a, the web 3 may be cut by a suitable cutter. Groups of articles may then be furnished on short lengths of the liner paper comprising the web 3, or the web 3 may form individual protective liners for individual articles. In instances where it is inconvenient, or not necessary or desirable, to pick up the non-utilized adhesive exposed to the sides of the articles the liner paper of the web 3 may be cut to the same size as the outline configuration of the articles, or the articles themselves may be removed, together with the adhesive, from the web 3.

It is also a practice of the invention to use a succession of short separate webs, rather than a single continuous web 3, upon which the adhesive is first applied. For such separate webs a stiff sheet material may be advantageously employed, thereby providing a firm semi-rigid dispensing card that facilitates handling of the articles by the ultimate user. Another practice of the invention is illustrated in Fig. 3, where a typical article 42 is in of itself a plurality of labels 43. In this instance, after excess adhesive is removed from the web, as already accomplished in Fig. 3, the labels 43 may be cut from one another as along the dotted lines 45, to form individual labels each complete with a protective liner. Removal tabs 44 to the sides of the labels 43 are provided upon cutting along the lines 45 to facilitate removal of the protective liners at the time when application of the labels 43 is made.

While a permanently tacky pressure sensitive adhesive has been described in connection with the drawings, other forms or classes of adhesives may also be employed. An example is the heat activated adhesives, which display a tacky characteristic upon subjection to elevated temperatures. When employing such an adhesive the apparatus of the invention is confined within a housing having elevated interior temperatures.

Another application of the invention is the transfer of adhesive to continuous webs, rather than individual articles. This is of particular advantage where materials affected by heat are to receive adhesive. An example is vinyl which readily stretches when heated, and therefore does not present a desirable web upon which adhesive in a solvent may be deposited, and then heated to drive off the solvent.

The practice of the invention eliminates individual handling of a plurality of articles to which an adhesive

mass is to be transferred, for purposes of later attachment of the articles to other surfaces. A large plurality of articles, or labels, may be rapidly and efficiently coated with adhesive in a manner that makes available individual adhesive coated articles for a wide range of use which has been heretofore prohibitive, due to the expense and difficulty of transferring adhesive to such articles.

I claim:

1. The method of transferring an adhesive to the surface of an article comprising placing a layer of adhesive, selected from the group consisting of permanently tacky adhesives and adhesives reactivatable to a tacky state, in separable adherent contact on a web having a surface with which the adhesive has a relatively weak adherence, covering a portion of the adhesive layer by placing the article upon the adhesive whereby adhesive to the sides of the article remains exposed and is not utilized as a part of that being transferred to the article, with the article surface contacting the adhesive being of a condition that the adhesive has a relatively strong adherent bond therewith that is of greater strength than the bond between the adhesive and the web, and removing non-utilized adhesive on the web remaining in exposed condition to the sides of the article.

2. The method of transferring an adhesive to surface areas of a plurality of articles comprising advancing a web which has a surface characterized by relatively poor affinity for an adhesive past a station at which an adhesive, selected from the group consisting of permanently tacky adhesives and adhesives reactivatable to a tacky state, is deposited upon the web, subsequently placing a plurality of articles upon the web as it is advanced beyond the station of adhesive deposit, and removing adhesive from the web which is not in contact with the articles by contacting the adhesive with surfaces for which the adhesive exhibits greater adherence than for the surface of the web.

3. The method of transferring an adhesive to surface areas of a plurality of thin articles comprising advancing a web which has a surface characterized by relatively poor affinity for an adhesive past a station at which an adhesive, selected from the group consisting of permanently tacky adhesives and adhesives reactivatable to a tacky state, is deposited upon the web, subsequently placing a plurality of thin articles upon the web as it is advanced beyond the station of adhesive deposit, temporarily laminating the web to a second web for which the remaining exposed adhesive has a greater affinity than for the first web, and splitting the two webs from one another with the remaining adhesive being transferred to the second web and articles being attached to the first web.

4. The method of transferring an adhesive to surface areas of a plurality of articles comprising depositing an adhesive, selected from the group consisting of permanently tacky adhesives and adhesives reactivatable to a tacky state, in a layer upon a web which has a surface characterized by relatively poor affinity for the adhesive, subsequently placing a plurality of articles upon the adhesive layer with a surface of such article coming into adherent contact with the adhesive and having a stronger bond therewith than that between the adhesive and the web, moving the web through an abrupt turn thereby splitting the articles from the web with the articles retaining the adhesive adherently bonded thereto, contacting the surface of the web with pick-up surfaces that remove the non-utilized adhesive from the web, and leading the web to the position of said abrupt turn and moving the web as a continuation of the portion of the web just immediate to the turn whereby articles split from the web move onto web areas free of adhesive.

5. The method of transferring an adhesive to a plurality of thin flexible articles comprising depositing a viscous adhesive fluid including a solvent upon a sheet that has had a release coating applied to the surface

thereof, evaporating the solvent to leave a tacky layer of adhesive upon the release coated surface of the sheet, placing a plurality of articles upon the sheet with a surface of each resting upon the adhesive and coming into adherent contact therewith with a bond greater than that between the adhesive and the release coated surface, feeding the sheet together with a second sheet with which the adhesive will have a much stronger bond between a pair of rolls to engage each sheet with the adhesive, said articles covering a portion of the adhesive when they are placed upon the sheet whereby some of the adhesive remains exposed to the sides of the articles and separating the two sheets with the second sheet removing the adhesive to the sides of the articles from the release coated surface of the first sheet.

6. An apparatus for the transfer of adhesive to an article comprising a supply spool for supporting a roll of flexible liner paper; an adhesive applying roll; an adhesive fountain adjacent said roll for applying a continuous layer of adhesive to liner paper drawn between the applying roll and fountain; heating means in heating relation to a liner paper drawn past the applying roll; a dispenser adapted to place a plurality of articles in spaced relation upon an adhesive coated liner that has moved past said heating means; and adhesive removing means that bridges across the articles to bear against both the articles and areas of said liner to the sides of the articles, which adhesive removing means has an adhesive attractive surface adapted to remove adhesive from the liner that is exposed to the sides of the articles.

7. An apparatus for the transfer of adhesive to an article comprising a supply spool for supporting a roll of flexible liner paper; adhesive applying means for applying a continuous layer of adhesive to liner paper drawn from the roll; a dispenser adapted to place a plurality of articles in spaced relation upon an adhesive coated liner that has moved past said adhesive applying means; and adhesive removing means that bridges across the articles to bear against both the articles and areas of said liner to the sides of the articles, which adhesive removing means has an adhesive attractive surface

adapted to remove adhesive from the liner that is not contacted by the articles.

8. An array of metallic labels comprising a first sheet liner having a surface thereof treated with a release coating material, a plurality of thin metallic labels each bearing marking indicia on the front thereof and having the reverse side facing said surface of said first liner to define closely spaced interfaces, a layer of pressure sensitive permanently tacky adhesive between the interfaces of said labels and said first liner temporarily adhering the labels to the first liner, which adhesive layer extends over an area of the first sheet liner that is to the sides of the labels, and a second sheet liner laminated with said first liner which covers the labels and the adhesive to the sides of the labels, said adhesive having a stronger bond with the labels and said second liner than with said release coated surface.

9. The method of transferring an adhesive to the surface of an item comprising placing a layer of tacky adhesive on and in separable adherent contact with a web that has a surface with which the adhesive has a relatively weak bond; bringing an item into contact with the adhesive upon the web, the surface of the item contacting the adhesive being of a condition that the adhesive has a relatively strong adherent bond therewith; and pressing an adhesive attractive surface against the item and against the web to the sides of the item to thereby remove adhesive from the web that was not covered by the item.

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