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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

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| INVENTOR(S) | | |
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Additional inventors are being named on the _____ separately numbered sheets attached hereto

TITLE OF THE INVENTION (500 characters max)
Machine and Method for Applying Thermoplastics or Adhesives To Roofing Materials with Nail Tabs

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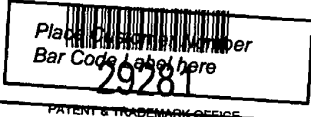
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ENCLOSED APPLICATION PARTS (check all that apply)

Specification Number of Pages

Drawing(s) Number of Sheets

Application Data Sheet. See 37 CFR 1.76

CD(s), Number

Other (specify)

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Respectfully submitted,
SIGNATURE
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Print Methodology for Applying Adhesive or Plastic Materials
To Roofing Materials to Form Nail Tabs or Reinforcing Strips

U.S. Provisional Patent Application of:

David Collins.

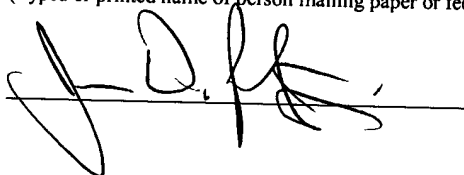
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A handwritten signature in black ink, appearing to read 'J. D. Petruzzi', is written over a horizontal line.

Print Methodology for Applying Adhesive or Plastic Materials To Roofing Materials to Form Nail Tabs or Reinforcing Strips

Summary

The invention is to the print method, a gravure, rotogravure or gravure-like transfer printing (the "gravure process") or offset printing, of an appropriately viscous adhesive or plastic material onto roofing material, or onto a continuous transfer material and then transferred, including utilizing a laminating process, onto the roofing material, in a continuous process. The gravure process employs a print cylinder which has etched or engraved cells of varying depth, width and shape and which cells can be varied to apply differing amounts of tab material as a means of controlling the pattern and other attributes of the resultant tab.

A composite roofing material includes a final condition underlayment, roll roofing or shingle material having bonded thereto appropriate rows of nail tabs or continuous reinforcing strips preferably made of, either in total or in part, adhesive or plastic-based material, including thermo-plastic, hot-melt adhesive or ultra-violet light curing polymer material, and can include materials of contrasting color to the roofing material or any other materials which tailor the primary plastic or adhesive properties.

The materials used or applied in the print methodologies, described herein, to form nail tabs or continuous reinforcing strips on the roofing materials are adhesives or plastics (the "tab material"). The plastic materials specifically include thermoplastics, thermo sets and elastomers and any additives which tailor plastic properties. The adhesive materials specifically include liquid adhesive, hot-setting adhesive and light curable adhesive.

A gravure process is used to apply the plastic, thermoplastic, hot-melt adhesive or ultra-violet curing polymer tab or continuous strip material to an engraved cylinder, and then wipe the tab material from the surface by a doctor blade, leaving the tab material only in the engraved image areas on the cylinder. Each engraved image area etched into the cylinder, commonly called the print cylinder, creates a depression, the design of which controls the shape, width and thickness of the formed nail tabs.

The process to make the nail tabs or the continuous reinforcing strip is to convey the dry felt or unsaturated material and/or the saturated underlayment, roll roofing or shingle material in a continuous process and into contact with an etched cylinder and with sufficient pressure so that the roofing material picks up the tab material left in the depressions on the cylinder while the tab material is in a liquid state and to form tabs of appropriate size and appropriately patterned across the underlayment surface.

In a second embodiment, a continuous transfer material is in contact with the etched gravure print cylinder and with the saturated underlayment, roll roofing or shingle material with sufficient pressure so that the continuous transfer material both picks up the tab material left in the depressions on the print cylinder and transfers the tab material onto the roofing material while the tab material is in a liquid or semi-liquid state and to form tabs or continuous

reinforcing strips of appropriate size and appropriately patterned across both the continuous transfer material and the underlayment, roll roofing or shingle material.

Brief Description of The Drawings

Figure 1: Illustrates a Gravure Process in accordance with the invention.

Figure 1A: Illustrates Etched Pattern(s) in an Impression Roll.

Figure 1B: Illustrates Tab Material Adherence to Roofing Material.

Figure 2: Illustrates Gravure Print Directly onto Roofing Material.

Figure 3: Illustrates Gravure Print Module for Direct Print onto Roofing Material.

Figure 4: Illustrates Gravure Print Transfer Process.

Figure 4A: Illustrates Gravure Print Transfer Process With Drum, Roll, or Wheel.

Figure 5: Illustrates a schematic side view of the ultra violet or other light curable process.

Figure 6: Illustrates a side view of the tab material being printed on a transfer surface or lamination process.

Figure 7: Illustrates an embodiment using: a series of rolls to hold the web.

Field of The Invention

The invention relates generally to roofing materials or other building materials normally employed as cover materials over a wood roof deck or stud wall and more specifically to such cover materials incorporating therein a plurality of integrally formed nail tabs or a continuous reinforcing strip.

Background of The Invention

The Typical Roof Composition. A roof installation generally comprises at least two distinctive layers applied over a roof deck. The first layer is an underlayment, usually a saturated asphalt material that attaches directly to the roof deck, oftentimes a wood frame of wood studs and plywood sheets or board material. The second layer is made up of the shingles, wood shakes, and metal or tile roof coverings themselves. Specific materials, layers of materials and actual application methods differ by type of building. Normally, the underlayment assists in making the roof resistant to water intrusion.

The Typical Underlayment Substrate. The underlayment is usually an asphalt saturated substrate. The starting material for the underlayment, or the substrate material itself, is a base material usually referred to as "dry felt". Examples of types of dry felt starting material are rag, paper and fiberglass, although other suitable starting base materials may be employed. The starting base material in a preferred embodiment is a fibrous paper made from treating recyclable cardboard; however, this invention is not limited thereto. The term "dry felt" used herein is used generically for all suitable starting base material. Dry felt material when saturated with an asphalt material produces an underlayment roofing material known in the trade as "tar paper" or "saturated felt," which is produced in various grades depending on thickness and weight.

The Underlayment Installation. Regardless of the type of underlayment roofing material that has been employed, common practice in the installation industry has been to unroll a length of the underlayment material and affix each length to the support sheets or boards at a plurality of locations so that it stays in place prior to the installation of the covering shingles. The affixing or fastening devices for this material are generally staples and nails. Staples and nails are readily applied by power devices; however, both are notoriously susceptible to either pulling out of the sheets or boards when there is uplift on the underlayment or, when the staples or nails stay in place, tearing of the roofing material at the fastening locations. Even when shingling is to follow immediately, the underlayment can still be exposed alone to windy and other adverse conditions, such as when the installers walk or crawl on the underlayment.

Moreover, it is desirable that the underlayment be securely attached independently of the shingles, wood shakes, metal tile or other roof covering not only in the pre-shingling or pre-roof covering stage of installation, but also in the final installation. This is because shingles or other roof coverings do get damaged, blown or ripped off the roof under adverse weather conditions and a secure independently installed underlayment will provide some interim protection from the weather elements prior to roof repair. When the underlayment is not securely fastened, then the underlayment may be blown away or ripped concurrently with shingle damage.

Current Underlayment Installation Practice Using Washers. To securely install the underlayment and avoid the tearing described above, it has long been a common practice to either use roofing nails with large heads or to use an auxiliary large washer or tab that lies underneath the nail head. Such large washer or tab successfully resists being torn through as with a smaller nail head of regular size. The use of such washer or tab has not been totally satisfactory, however, since such use is time consuming, somewhat expensive, and can be somewhat dangerous when the installation is on a fairly steeply pitched roof and/or the conditions are inclement. This is because it requires two hands to either slip the washer over the nail or to hold a tab down while driving the nail through. If the installer has to reach while only supporting himself or herself on a toe board, it may be uncomfortable and/or unstable to be unable to use either hand for additional support when necessary. Moreover, nails with large, unconventional heads are not recommended both because they are expensive and because they cannot be used in ordinary power equipment. Ordinarily, power equipment for driving nails can be loaded only with standard nail cartridges.

Description of Invention

In accordance with the preferred embodiments of the invention, we disclose several new and useful methods and product using these methods:

- (a) that an improved method in which tabs can be permanently and reliably affixed or bonded to either dry felt, saturated felt or roll roofing material or shingles can be automated using an appropriately viscous tab material that quickly solidifies and adheres or bonds to the surface of the roofing material;
- (b) that appropriately viscous tab material, in its total or in its part, is a plastic or adhesive material, specifically including thermoplastic, hot-melt adhesives and ultra-violet curing polymer materials and is or is not of at least one contrasting

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