US 20110173908A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0173908 A1

(43) Pub. Date: Jul. 21, 2011

Kahle

(54) METHOD AND APPARATUS FOR REDUCING SOLAR RADIATION ABSORPTION THROUGH A ROOF

(75) Inventor: **Peter Kahle**, Oregon, OH (US)

(73) Assignee: **SE2 International LLC**, Sebastian, FL (US)

(21) Appl. No.: **12/960,981**

(22) Filed: **Dec. 6, 2010**

Related U.S. Application Data

(60) Provisional application No. 61/295,393, filed on Jan. 15, 2010.

Publication Classification

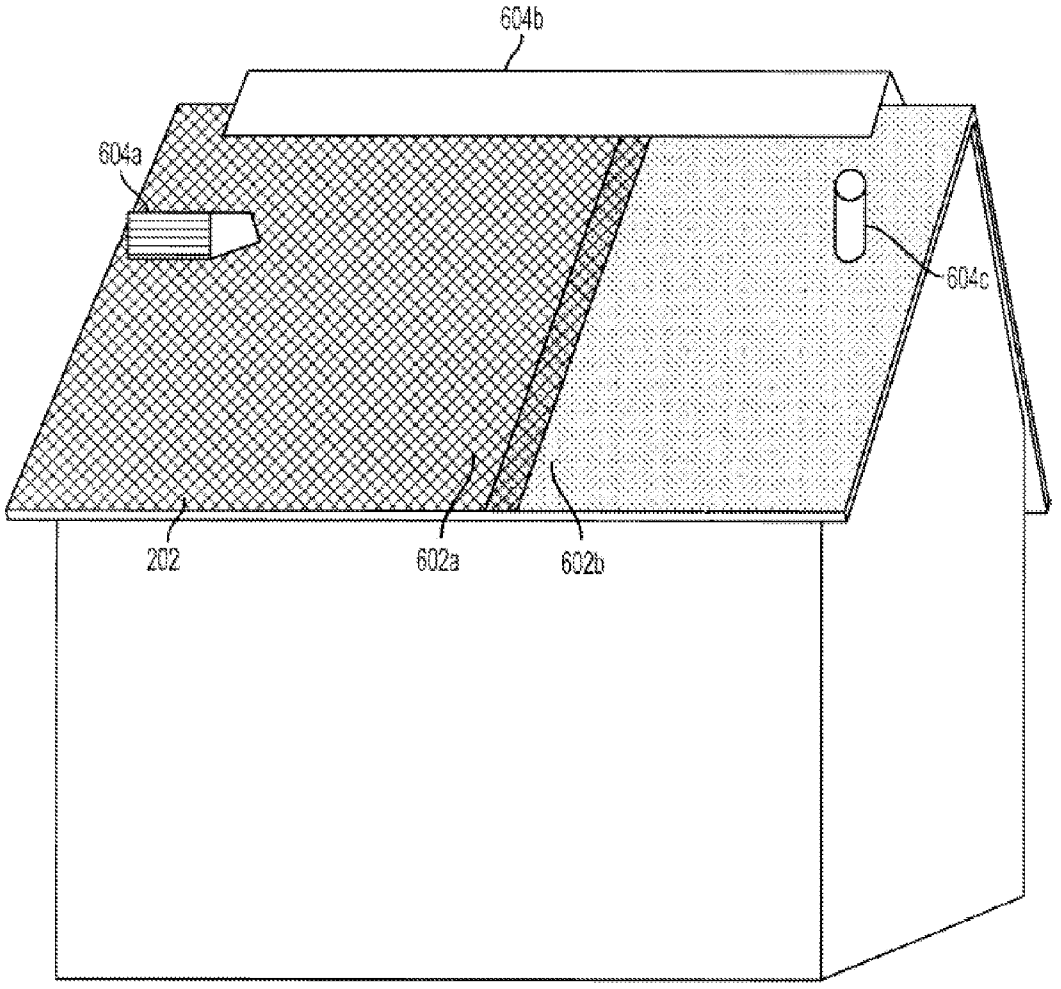
(51) **Int. Cl.**

E04B 1/78	(2006.01)
E04B 7/00	(2006.01)
E04D 5/14	(2006.01)
E04D 5/10	(2006.01)

(52) **U.S. Cl.** **52/273**; 52/741.4; 52/745.21

(57) **ABSTRACT**

Structures and methods use a high-albedo fabric to cover the surface of building roofs, thereby shielding the roof from solar radiation that would otherwise be absorbed into the roof as heat. The high-albedo fabric may be standard or a modified version of SunTex® 90% woven polyester-polyvinyl fabric. Produced in large sizes, the material may be placed on the roof similar to how wall-to-wall carpet is installed, with bonded seams and cutouts for the vents, stacks, and other roof structures. The high-albedo fabric may be adhered to the roof surface and attached the roof edges with fabric binding clips, thereby ensuring the fabric is resistant to wind damage. The high-albedo fabric may be printed with designs (e.g., shingle or roof tile patterns) that enable the fabric to be applied to existing structures without altering the aesthetic appearance of the roof.



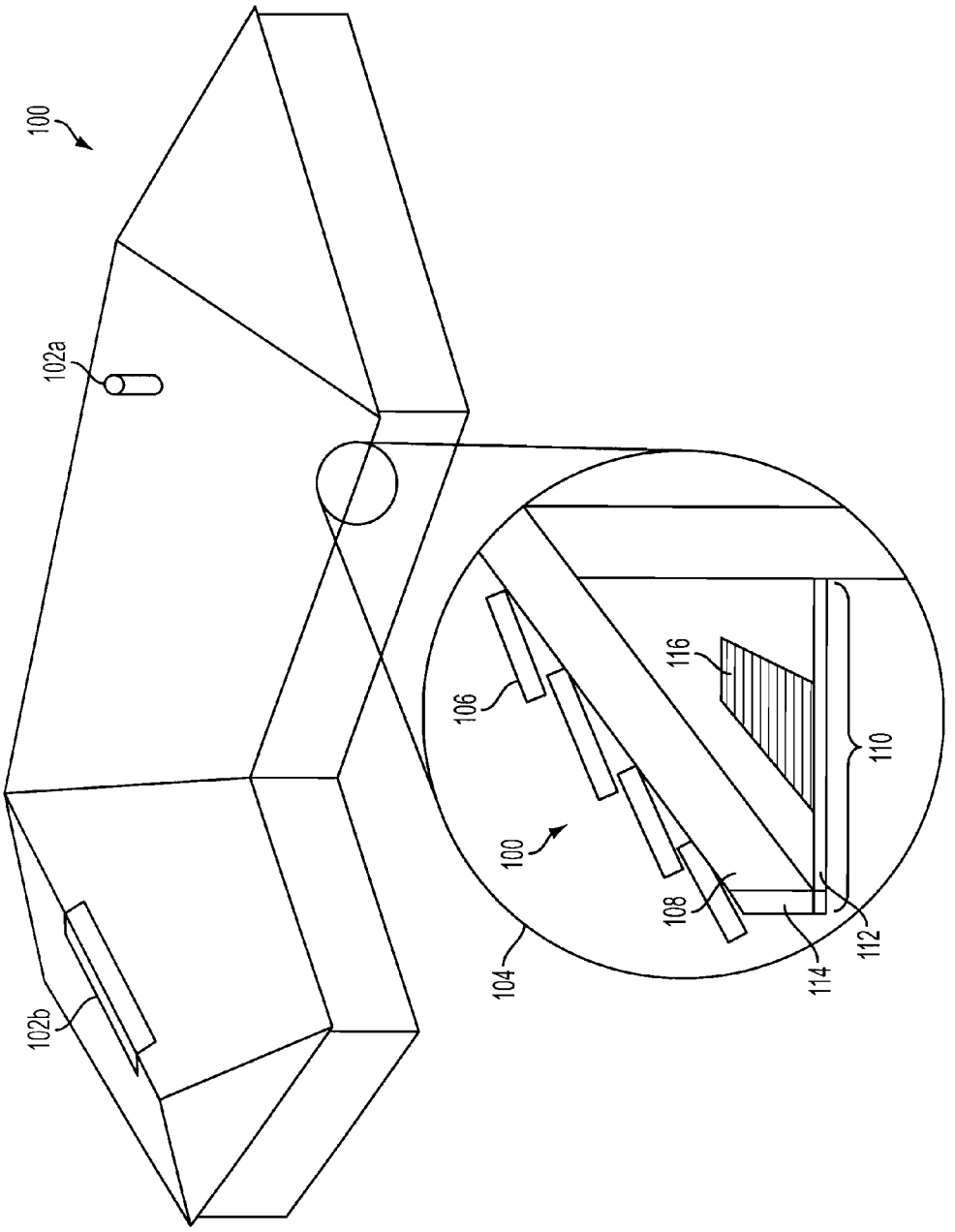


FIG. 1
PRIOR ART

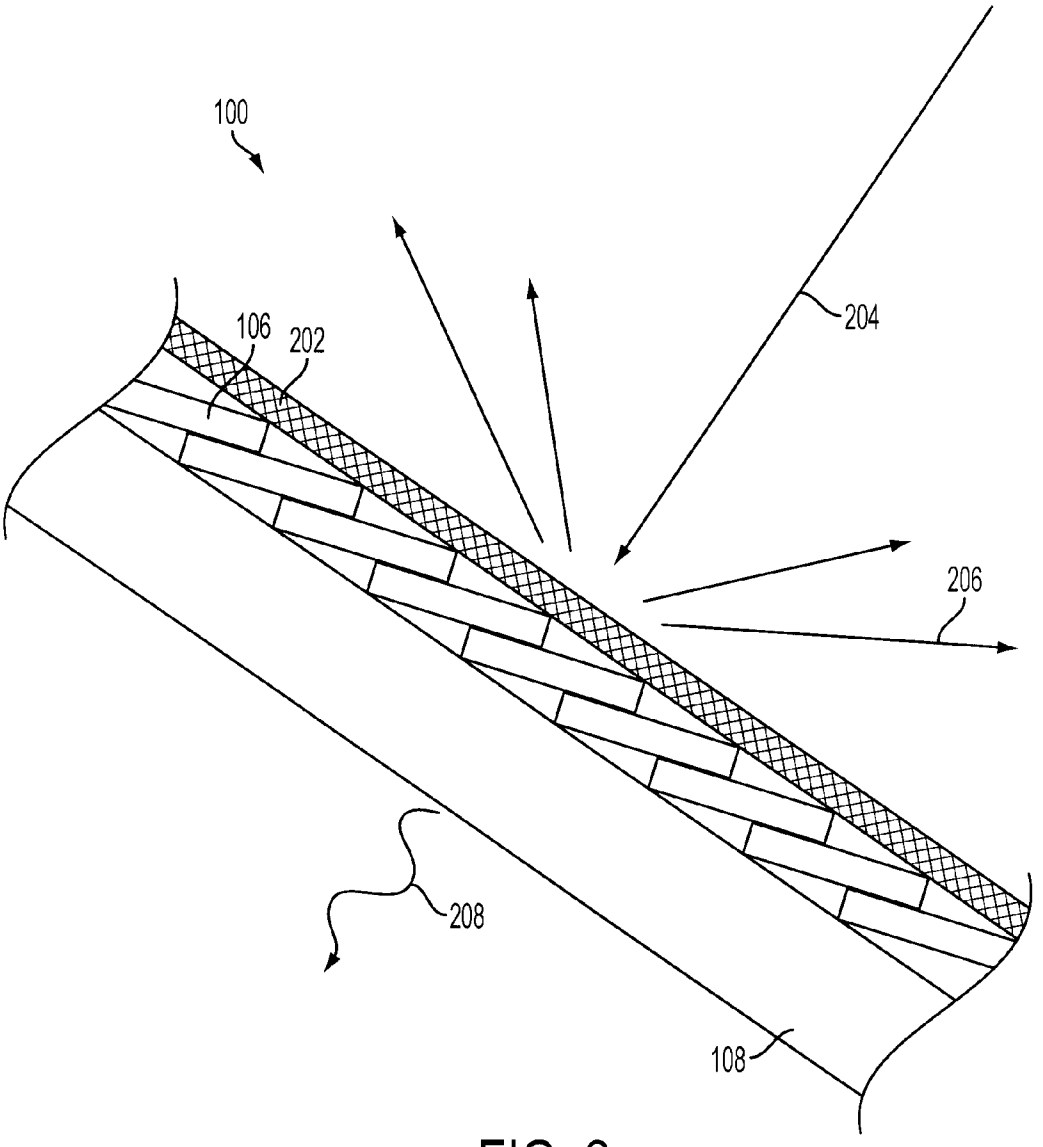


FIG. 2

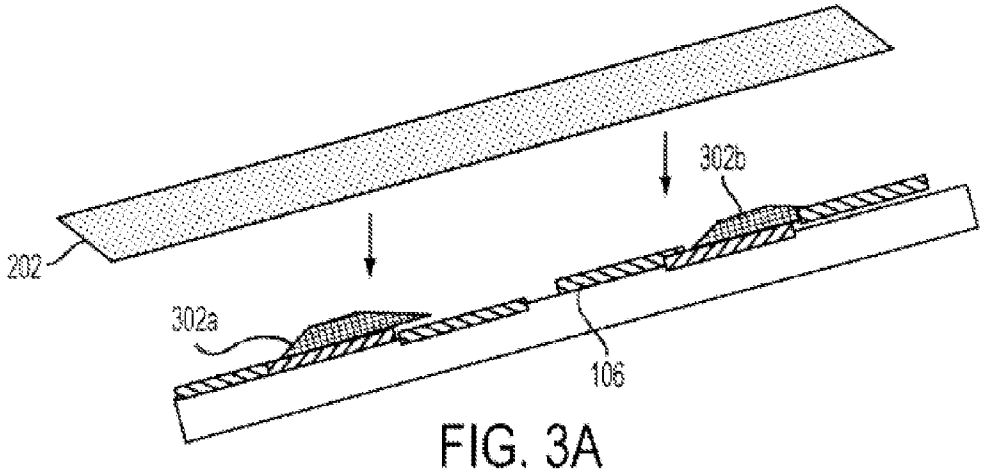


FIG. 3A

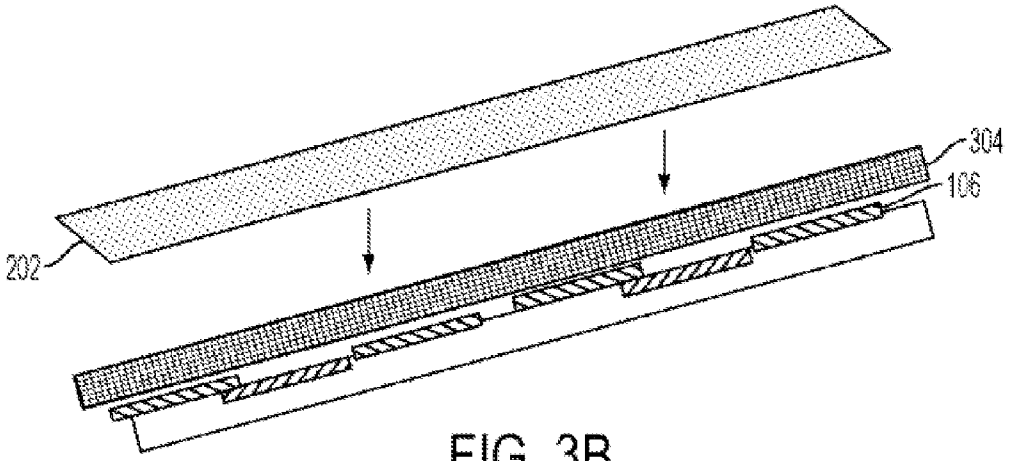


FIG. 3B

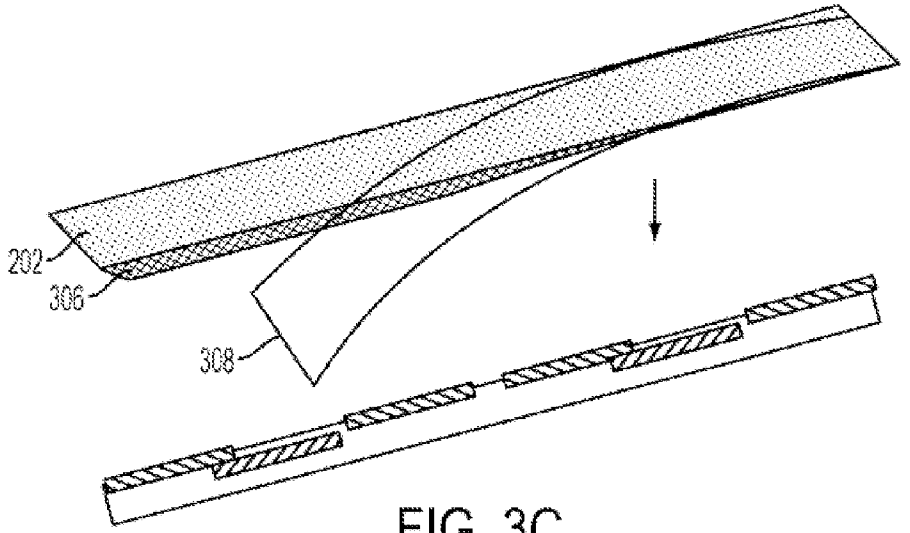


FIG. 3C

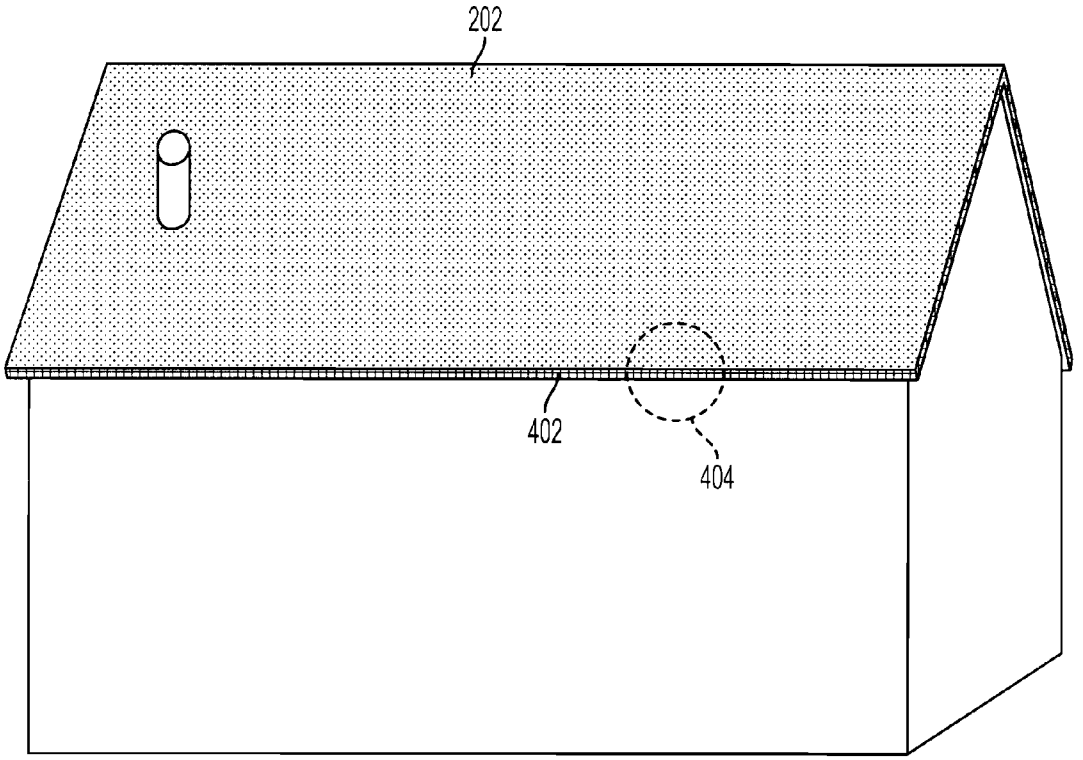


FIG. 4

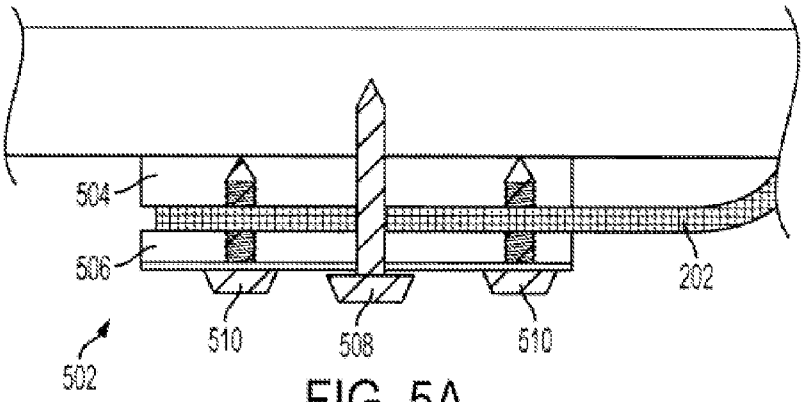


FIG. 5A

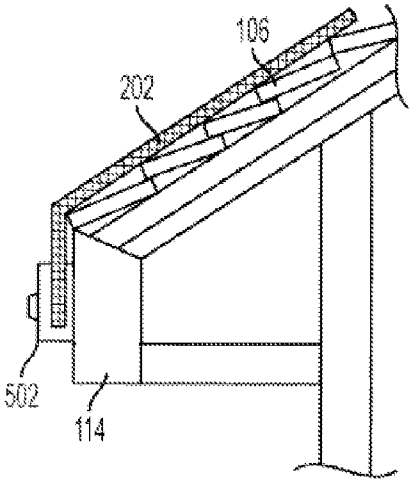


FIG. 5B

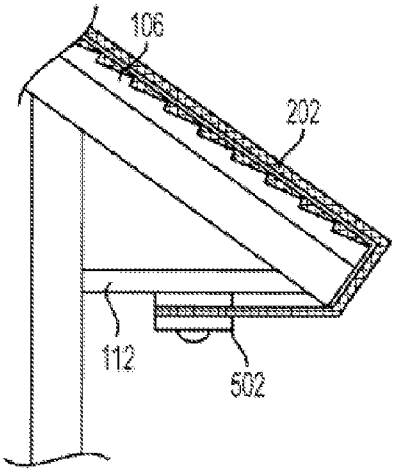


FIG. 5C

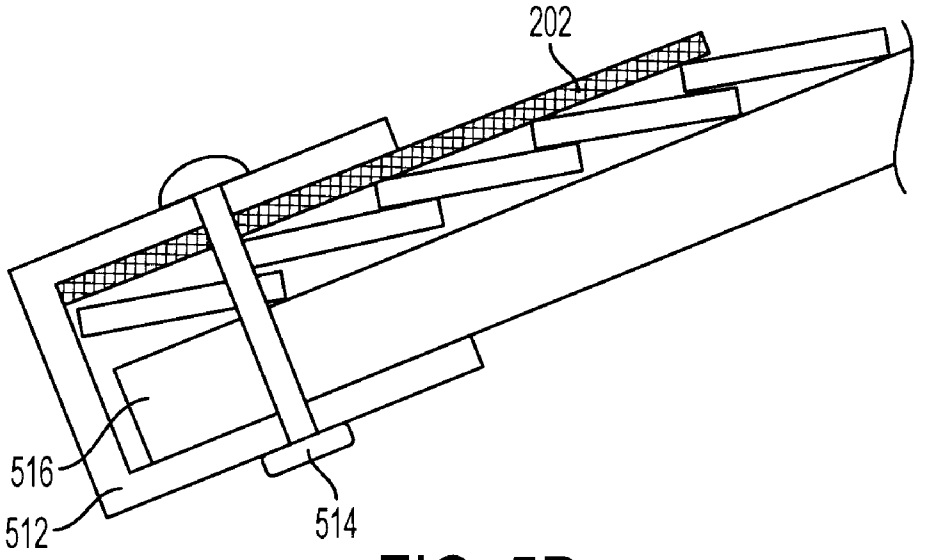


FIG. 5D

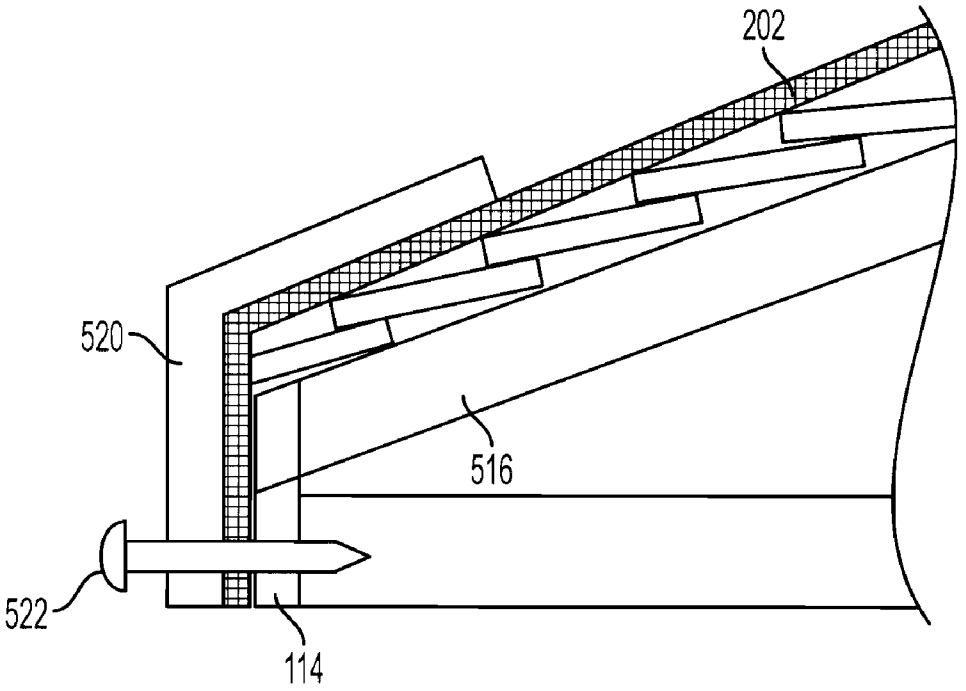


FIG. 5E

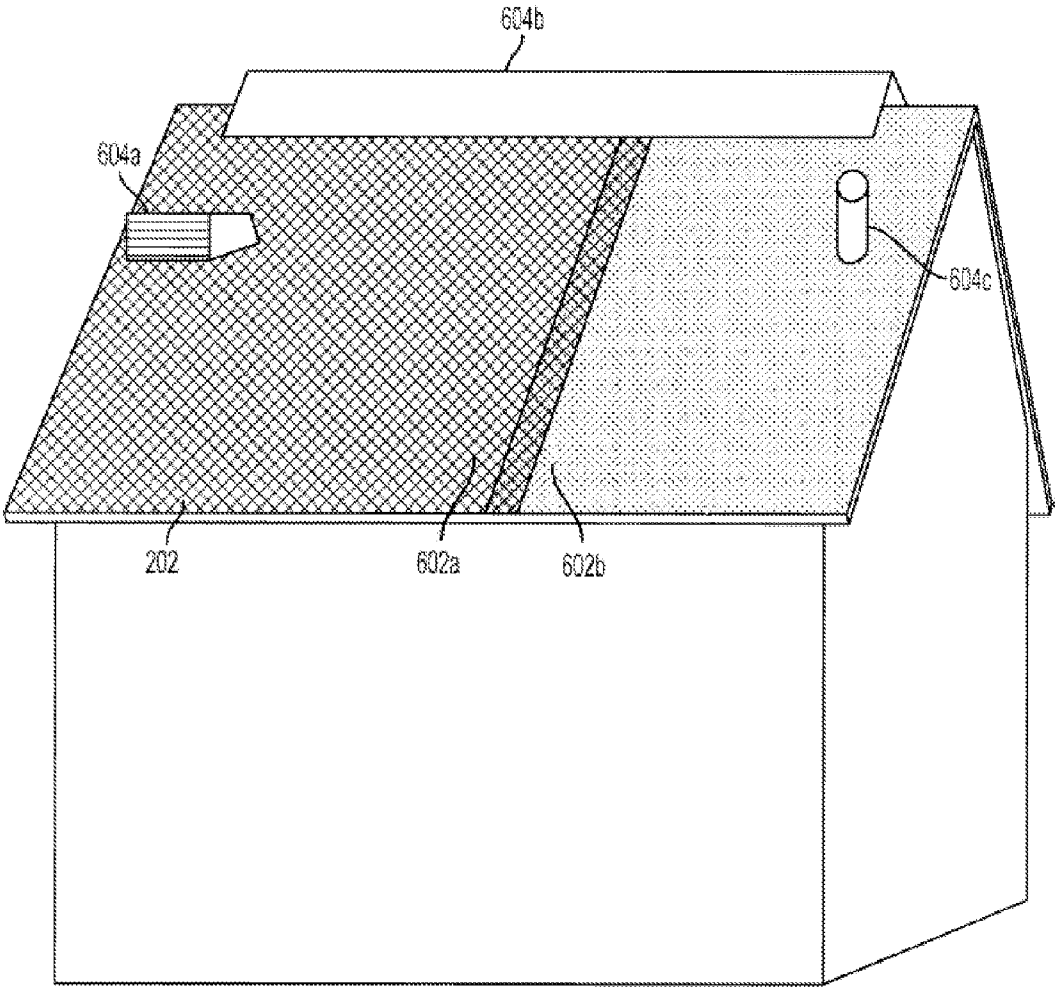


FIG. 6

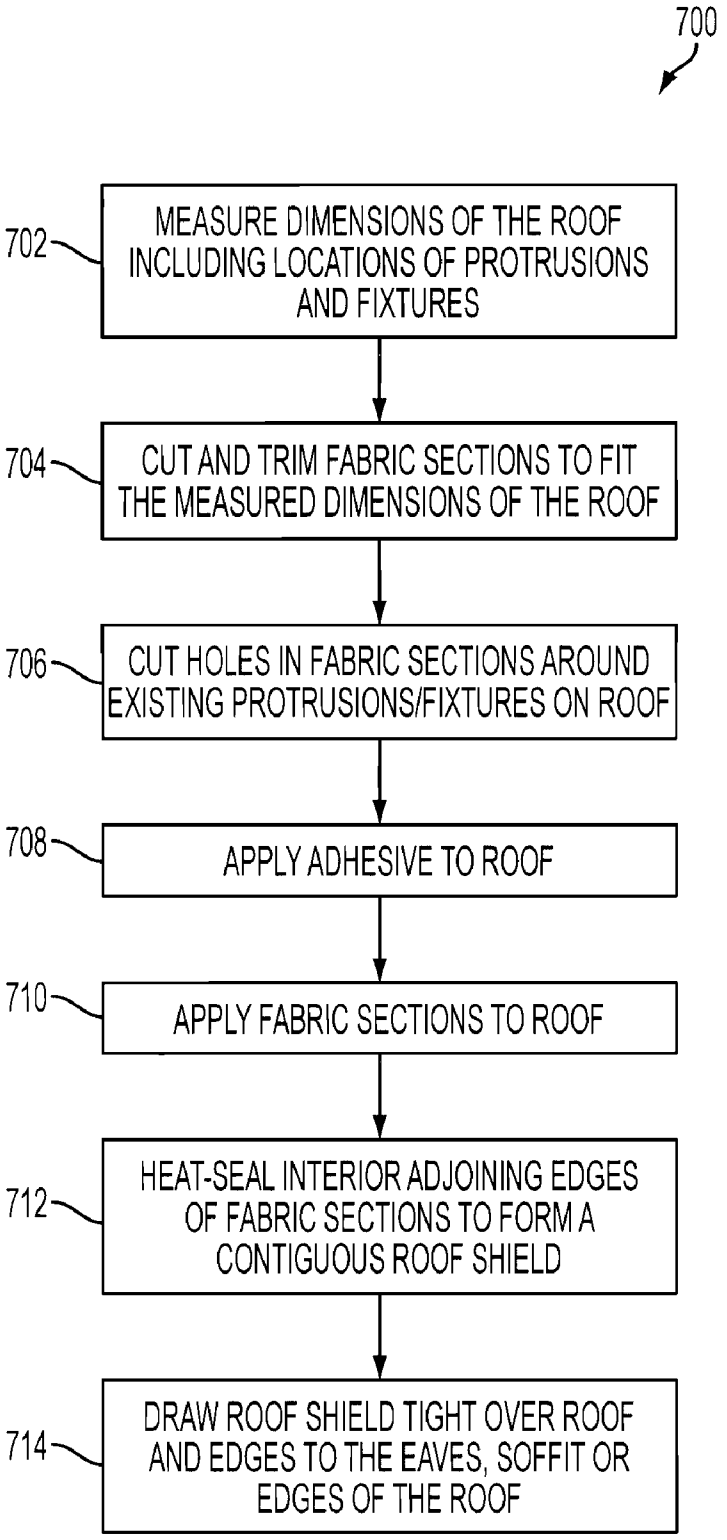

700
702
MEASURE DIMENSIONS OF THE ROOF INCLUDING LOCATIONS OF PROTRUSIONS AND FIXTURES
704
CUT AND TRIM FABRIC SECTIONS TO FIT THE MEASURED DIMENSIONS OF THE ROOF
706
CUT HOLES IN FABRIC SECTIONS AROUND EXISTING PROTRUSIONS/FIXTURES ON ROOF
708
APPLY ADHESIVE TO ROOF
710
APPLY FABRIC SECTIONS TO ROOF
712
HEAT-SEAL INTERIOR ADJOINING EDGES OF FABRIC SECTIONS TO FORM A CONTIGUOUS ROOF SHIELD
714
DRAW ROOF SHIELD TIGHT OVER ROOF AND EDGES TO THE EAVES, SOFFIT OR EDGES OF THE ROOF

FIG. 7

METHOD AND APPARATUS FOR REDUCING SOLAR RADIATION ABSORPTION THROUGH A ROOF

RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/295,393, filed Jan. 15, 2010.

FIELD OF THE INVENTION

[0002] The present invention relates generally to roofing systems, and more particularly to methods, materials and apparatus for reducing the amount of solar energy absorbed by a roof.

BACKGROUND

[0003] The high level of energy consumption by homes and buildings is an issue which has received considerable attention in the recent years due to concerns about the environment and rising energy costs. A building's roof absorbs a significant amount of solar radiation in the form of heat, much of which is transferred to the underlying structure by conduction. High levels of heat absorption through a roof ultimately elevate the amount of energy required to air-condition the indoor space to a cool temperature, especially in areas with consistently strong sunlight exposure throughout the year. Shingles made of asphalt or made of asphalt-mixtures are frequently used in current residential roofing systems because of their durability, waterproofing function characteristics, and relatively low cost. However, most of the materials used to make shingles and other protective roof membranes, including asphalt, tend to absorb solar energy.

SUMMARY

[0004] The various embodiments and methods provide economical shielding for roofs that reflects a large amount of solar energy by covering the roof with a high-albedo fabric, thereby reducing the thermal load on the building. The various embodiments may be implemented on existing structures by cutting openings in the fabric to accommodate existing roof fixtures, enabling installation without changing the shingles, decking, and/or other roof materials, and without altering the aesthetic appearance of the roof. In addition to reducing energy consumption on cooling, the various embodiments may enable the construction of roofs with greater wind resistance by providing an effectively smooth surface on the roof, eliminating potential lift of the individual shingles at their exposed edges and by decreasing the amount of soffit vent area necessary to keep the roof properly ventilated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The accompanying drawings, which are incorporated herein and constitute part of this specification, illustrate exemplary aspects of the invention. Together with the general description given above and the detailed description given below, the drawings serve to explain features of the invention.

[0006] FIG. **1** is a perspective view generally showing a prior art roof with an enlarged cross-sectional view generally showing a portion including an eave.

[0007] FIG. **2** is a cross-sectional schematic view of a roof illustrating reflection and absorption properties of a roof shield.

[0008] FIGS. **3**A-**3**C are cross-sectional views of a segment of a roof illustrating alternative methods for attaching a roof shield according to various embodiments.

[0009] FIG. **4** is a perspective view of a structure with a roof shield installed.

[0010] FIGS. **5**A-**5**E are cross sectional details views illustrating alternative structures for securing a roof shield according to various embodiments.

[0011] FIG. **6** is a perspective view of a structure illustrating various installation accommodations for roof shield according to an embodiment.

[0012] FIG. **7** is a process flow diagram of a method for securing a roof shield to a roof according an embodiment.

DETAILED DESCRIPTION

[0013] The various aspects will be described in detail with reference to the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts. References made to particular examples and implementations are for illustrative purposes and are not intended to limit the scope of the invention or the claims.

[0014] The word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any implementation described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other implementations.

[0015] The term "eave" is used herein consistent with its customary meaning in the building industry to refer the lower portion of a sloping roof which projects beyond the exterior side wall of a structure, i.e., the gap between a structure's siding and the roofline. The term "soffit" is used herein consistent with its customary meaning in the building industry to refer to any structure that forms an enclosing surface from top of an exterior side wall to the outer edge of a roof. The term "facia board" is used herein consistent with its customary meaning in the building industry to refer a structure which forms the end of a roof support element (e.g., rafter or truss) and/or decking on the exterior of a roof. A fascia board may run, for example, perpendicular to a horizontal soffit or may run perpendicular to the slope of the rafters and decking.

[0016] As used herein, the terms "decking" and "deck" refer to the under-support layer of a roof which is between the primary structural components (e.g., trusses and joists) and the weatherproofing layer (e.g., shingles, tiles, etc.). The decking may be made from a variety of materials, including, but not limited to, plywood sheathing, wood tongue and groove, corrugated metal, encapsulated polystyrene, and reinforced concrete.

[0017] The various embodiments are illustrated in the drawings and described herein with reference to a roofing system with a weatherproofing layer built with shingles, which is merely one example of a roof construction that may benefit from the various embodiments. The following descriptions and the figures are not intended to limit the scope of the claims to any particular structure, design or construction.

[0018] A roof is generally formed by fastening a sheet of decking material, such as wood plank or metal, to the top of the structural components. FIG. **1** illustrates an example of a standard cross-gabled roof **100** which has protruding roof vents **102***a*, **102***b*. The eave **110** contains a soffit **112** and a fascia board **114**. The expanded view **104** of the edge of the roof **100** further shows an individual soffit vent **116** built in

the eave **110**. A roofing system made of weather- and water-protective materials is typically attached to the decking **108**. For example, the expanded view **104** shows a layer of shingles **106** installed on top of the decking **108** and the details of an eave **110** of the roof. Shingles **106** are commonly used to form the weatherproof roofing system, and may be made out of a variety of materials (e.g., asphalt, fiberglass, wood, ceramics, slate, etc.), but weatherproof roofing systems are also frequently made from ceramic or fiberglass roof tiles.

[0019] The materials used to make shingles and roof tiles, which are efficient in sheltering a roof from water and weather, tend to absorb radiation from the Sun in the form of heat and conduct such heat to the interior of the building. Thermal energy from the roof structure conducted into the structure can result in hot air in the inner spaces of the roof, especially in the attic area, which adds to the thermal load on air conditioning systems. Thus, solar energy absorbed by the weatherproof roofing system used on a home can drive up the costs to air condition the home.

[0020] Sloping roofs are typically designed with one or many vents to allow breathing and air flow for the underlying attic space. Soffit vents **116**, either multiple individual or a single continuous vent, are commonly installed to complement existing roof vents **102***a*, **102***b* placed at a higher point. Current roof ventilation systems lower temperature through convection, with soffit vents working as inlets of ambient temperature air from outside. Where there are existing high vents on a roof, hot attic air rises and exhausts through the vents at the upper portion of the roof, creating a pressure differential in the attic that causes cooler air to be pulled in through installed soffit vents **116**. This current design is thermally inefficient, even when aided by ventilation fans that take suction from the attic and exhaust to the exterior of the house.

[0021] In strong winds, soffit vents **116** may contribute to roof destabilization, which increases the risk of roof damage or loss due to high wind conditions caused by hurricanes and tornadoes. Even a slight degree of roof damage may provide a point at which moisture can enter a home and cause mildew growth and waterlogged insulation, both of which can cause ceiling collapse. Further, light and moderate winds still may cause snow melt and other outdoor moisture to enter an attic directly through a soffit vent **116**. Thus, changes to roof systems that could eliminate the need for soffit vents would provide structural rigidity and service lifetime improvements, potentially enabling the soffit to be eliminated or closed off and allowing the attic space to be air conditioned as the conducted heat through the roof would be at or near the outdoor ambient temperature.

[0022] The various embodiment structures and methods deploy a high-albedo fabric onto the surface of roof structures, thereby shielding the roof from solar radiation that would otherwise be absorbed into the roof as heat. The high-albedo fabric, which may be standard or a modified version of SunTex® 80% or 90% woven polyester-polyvinyl fabric or an equivalent high-albedo material, reflects a large fraction of solar radiation (e.g., up to 80% for SunTex® 80% and up to 90% for SunTex® 90%), which provides the thermal shielding effect. By producing the high-albedo fabric in large width rolls, the material may be placed on the roof similar to how wall-to-wall carpet is installed, with bonded seams and cut-outs for the vents, stacks, and other roof structures. The high-albedo fabric may be glued, tarred or otherwise bonded to the roof surface, and edge binding structures may be used to secure the fabric to the edge of the roof, such as along eaves and soffits, thereby ensuring the fabric is resistant to wind damage. The various embodiments may be implemented on existing roofs without changing the shingles, decking, or other materials that make up the roof. Further, the high-albedo fabric may be printed with designs (e.g., shingle or roof tile patterns) that enable the fabric to be applied to existing structures without altering the aesthetic appearance of the roof. By reducing the thermal energy absorbed into the roof, the various embodiments provide significant energy savings without requiring significant structural changes to the roof. Further, the reduced heat load from the roof may enable the elimination of many, if not all, soffit vents, thereby reducing the vulnerability of a roof to high winds.

[0023] In an embodiment, the roof shield is constructed out of SunTex® 90% woven polyester-polyvinyl fabric material which is made by Phifer Incorporated of Tuscaloosa Ala. The technical characteristics of SunTex® 90% are as follows:

PRODUCT: SUNTEX 90 (23 x 16.5)			
	Reference Test	Nominal Results	
Characteristic	Method	Warp	Fill
Yarn diameter (in)	TMS-TM-001	0.025	0.025
Tensile Strength			
Cut strip method (lb)	ASTM D 5035	418	297
Grab method (lb)	ASTM D 5034	516	398
Tearing strength			
Trapezoid method (lb)	ASTM D 1117	110	73
Stiffness (mg)	ASTM D 3656	462	349
Stretch (%)	TMS-TM-OO2	3.3	4.2
Set (%)		0.3	0.5
Mesh weight (oz/sq yd)	ASTM D 3776	17	
Fabric thickness (in)	ASTM D 1777	0.037	
Bond strength (lb)	CS 248-64(5.5)	138	
Blocking	FS L-S-125B(4.4.9)	Scale 1	
Colorfastness to 1200 hrs	TMS-TM-OO3	All colors 4 min	
Color change according to AATCC Gray Scale			
Mullen bursting strength (psi) Initial	FS L-S-125B(4.4.7)	750	

In a further embodiment, the yarn diameter and weave density is increased in order to reduce the fabric pore size, which may improve the thermal properties of the material over long-term exposure on the roof surface. For ease of description, "SunTex" is used herein to refer to SunTex® 80% and/or 90% and derivatives of that material. SunTex is used to illustrate the various embodiments of the present invention, but is not intended to limit the subject matter recited in the claims except as specifically recited.

[0024] Previous efforts to minimize the absorption of solar radiation by rooftops has focused on using light color building materials, such as white asphalt shingles instead of dark ones. Such products, however, only reflect a small portion of solar radiation, typically limited to that within the visible light spectrum (i.e., with wavelengths (λ) from 400-700 nm). However, such materials still absorbed most of the thermal portion of the solar radiation. Approximately 44 percent of the solar radiation reaching the earth is in the visible spectrum, while seven percent is in the ultraviolet spectrum (λ=10-400 nm), and 49 percent is in the infrared spectrum

(λ=700-300,000 nm). Thus, half of the energy falling on the roof is thermal energy conveyed in the infrared spectrum.

[0025] The various embodiments reduce the thermal loading on roofs by reflecting much of the sun's thermal radiation with a fabric that exhibits a high albedo in the infrared spectrum. As illustrated in FIG. **2**, a roof shield **202** may be overlayed on top of the roof **100**. The roof shield **202** may be fitted tightly to existing protective shingles **106** to provide an evenly distributed barrier between the Sun's rays and the roof. A majority (up to 90%) of solar radiation **204** striking the roof shield **202** is reflected away by the fabric as reflected radiation **206**, ensuring that only a portion (~10%) of the solar radiation is absorbed as heat **208** and conducted into the roof.

[0026] As illustrated in FIGS. **3**A-**3**C, a roof shield **202** may be secured to existing shingles **106** using a variety of mechanisms. FIG. **3**A illustrates a first embodiment method for securing a roof shield **202** to shingles or roofing tiles. In this first embodiment, small patches **302***a*, **302***b* of an adhesive material, such as tar, are applied in a very thin layer across the shingles **106**. In one implementation, the patches **302***a*, **302***b* may be spaced approximately ten square feet from one another. Once the patches of adhesive material have been applied to the roof, the roof shield **202** may be laid over the roof, and may be pressed or rolled to achieve bonding with the adhesive.

[0027] FIG. **3**B illustrates a second embodiment method for securing a roof shield **202** to shingles or roofing tiles. In this second embodiment, the adhesive material, such as tar, may be applied in a single near-continuous layer **304** on the shingles **106** over most if not all of a roof's surface. Similar to the first embodiment, once the layer of adhesive material as been applied to the roof, the roof shield **202** is laid over the roof, and may be pressed or rolled to achieve bonding with the adhesive.

[0028] FIG. **3**C illustrates a third alternative embodiment in which the roof shield material is configured in the form of a three layer structure comprising a high albedo layer **202** (e.g., SunTex fabric), and adhesive backing layer **306**, and a non-adhesive removable layer **308** that protects the adhesive layer **306** until application. The substance used to form the adhesive backing layer **306** may be pressure sensitive adhesives, or more permanent adhesives, including by not limited to, epoxy, urethane, cranioplast, and hot melt adhesives. In this structure, the nonadhesive layer **308** is configured to protect the adhesive layer **306** from contact with other materials until the material is applied to the roof. To apply the material the roof shield **202** according to the third embodiment, the non-adhesive layer **308** may be peeled off the adhesive layer **306** as the material is rolled over the roof surface. This may be accomplished by rolling the pre-layer structure such that the nonadhesive layer **308** is on the exterior surface of the roll, enabling the nonadhesive layer **308** to be pulled off just before the adhesive layer **306** contacts the roof surface. After applying the roof shield, it may further be pressed or rolled to ensure proper bonding with the roof surface.

[0029] In order to ensure that wind cannot lift the edge of the windshield fabric along the edges of the roof, a fabric clamping structure may be applied to firmly fix the fabric to the eaves. FIG. **4** shows an example embodiment roof shield **202** in which one or more fabric edge clamps may provide coupling of the roof shield to the roof at edge **402**. Fabric edge clamps may provide structures for securing the exterior edges of the roof shield, enabling the fabric to be pulled tight across the roof and securely attaching it to a roof edge structure, such as the fascia board or soffit. Highlighted area **404** is shown in more detail in FIGS. **5**A-E, which illustrate various embodiment configurations of a fabric edge clamp.

[0030] FIG. **5**A illustrates details of a first embodiment of the fabric edge clamp **502** that may be used to secure the edges of a roof shield. In the embodiment illustrated in FIG. **5**A, the fabric edge clamp **502** includes a first clamping strip **504** and a second clamping strip **506** which cooperate to capture a portion of the roof shield fabric **202** by applying clamping pressure. The clamping pressure may be applied by to the first and second clamping strips **504**, **506** by a number of attachment fasteners **508**, such as a screws, nails or bolts, which are used to secure the fabric edge clamp **502** to the fascia board soffit, or other structure at the edge of the roof. Instead of using the attachment fasteners **508** to apply the clamping pressure to the first and second clamping strips **504**, **506**, the two strips may be clamped together by a number of strip-to-strip fasteners **510**. Such strip-to-strip fasteners **510** may be screws, rivets, or bolts.

[0031] The fabric edge clamp **502** illustrated in FIG. **5**A enables attachment to the soffit **112**, enables the edges of the roof shield to be attached to various structures typically employed on roofs. FIG. **5**B illustrates an example configuration in which the fabric edge clamp **502** may be secured to the fascia board **114** of a roof. FIG. **5**C shows an example configuration in which the fabric edge clamp **502** may be secured to the soffit **112**. In this latter configuration, the roof shield **202** may be pulled tight over the edge of the roof and a folded back under the soffit where it may be attached with a screw, nail or bolt, which would present a smooth transition and hide the fabric edge clamp out of sight.

[0032] FIG. **5**D illustrates a second embodiment fabric edge clamp **512** that may be used to secure the edges of a roof shield **202** to the edge of the roof. In an example embodiment, a roof shield **202** may be laid directly onto the shingles at the roof edge **516** and a fabric edge clamp **512** may secured over the fabric and the roof edge **516** by a fastener **514** that goes around the both the roof shield **202** and the roof edge **516**. This implementation may be preferred for use on vaulted roofs with an overhang that does not include a soffit or fascia board. The fastener **514** may be a threaded fastener or bolt.

[0033] FIG. **5**E illustrates details of a third embodiment of the fabric edge clamp **520** that may be used to secure the edges of a roof shield **202** to the roof edge **516** and fascia board **114**. In this embodiment, the roof shield **202** may be laid directly onto the shingles over the edge of the roof, extending over at least a portion of the fascia board. The fabric edge clamp **520** may be laid over the roof shield **202**, roof's edge **516** and fascia board **114**, clamping the fabric between the roof's edge **516** and fascia board **114**, with the clamping force applied by the fastener **522** which attaches the clamp **520** to the fascia board **114**. The fastener **522** may be a nail, threaded fastener or bolts. In this implementation the fabric edge clamp **514** may act as a structural reinforcement in addition to being clamped.

[0034] The edge clamps described in FIGS. **5**A-E may be built out of a variety of materials including, but not limited to, wood, fiberglass, metal (e.g., aluminum or an aluminum alloy) and durable plastic. Typically the fabric edge clamp structures will be made of rigid materials to provide rigid structures in order to transfer the clamping force from the fasteners to the fabric along a majority of the length of the claim structure, in addition to the clamping force provided by the various fasteners described above, the roof shield fabric

may further be attached to the fabric edge clamp by means of an adhesive (e.g., epoxy, tar, etc.) that may be applied to one or more surfaces of the clamp before the clamping pressure may be applied.

[0035] As illustrated in FIG. **6**, the interior edges of large high-albedo fabric strips **602***a*, **602***b* (i.e., edges of the high-albedo fabric strips that are not adjacent to roof edge) may be heat-sealed together to form one contiguous piece of fabric to form the roof shield **202**. Heat-sealing may be done at the time of installation of the roof shield **202** in order to provide a contiguous piece of fabric which closely fits the particular dimensions of the roof. Further, holes may be cut in the high-albedo fabric to create openings for existing roof vents **604***a*, **604***b*, **604***c*. Such holes may be cut in the fabric at the time of installation to exactly fit the individual shapes and locations of each roof vents **604***a*, **604***b*, **604***c*, enabling a custom fit to the unique layout of such fixtures on the roof. Closely fitting the high-albedo fabric around roof fixtures provides good thermal sealing, an attractive appearance, and additional support for anchoring the roof shield **202** onto the roof.

[0036] FIG. **7** illustrates an embodiment method **700** for constructing and installing a roof shield. At block **702**, the dimensions the roof may be measured, and pieces of roof shield material may be cut to match the measured size of the roof at block **704**. At block **706**, holes and cutouts in the roof shield material are cut to accommodate any protrusions and fixture on the roof (e.g., roof vents, chimneys, stacks, gables, etc.). At block **708**, the roof may be treated with an adhesive substance, such as tar, epoxy, glue, etc. At block **710**, the fabric sections are applied to the roof, such as by being rolled over the roof to contact the adhesive. At block **712**, the interior edges of adjacent fabric sections (i.e., those edges of adjacent fabric sections which are not adjacent to an edge of the roof) may be heat-sealed together to form a contiguous roof shield across the roof. Such heat sealing may be accomplished using known methods for joining the type of fabric used in the heat shield. At block **712**, the edges of the roof shield may be pulled tight may be attached to the roof such as by securing the edges with a fabric edge clamp **502** that may be nailed, screwed or bolted to an edge structure of the roof like the fascia board or soffit, such as is described above with reference to FIGS. **5**A-E.

[0037] It should be appreciated that the steps in method **700** may be performed in an order different from that shown in FIG. **7** and described above. For example, the holes in the fabric sections may be cut after the fabric sections are applied to the roof in block **710**. As another example, the application of the adhesive to the roof in block **708** may occur after or as part of the step of applying the fabric sections to the roof in block **710**. Further, the heat sealing of the interior adjoining edges in block **712** may be accomplished at any time after the fabric sections have been cut in block **704**, including after the sections are drawn tight and attached to the edges of the roof in block **714**. It should also be appreciated that additional steps may be involved in the installation of the roof shield without departing from the spirit of the claims.

[0038] In a further embodiment, the high-albedo fabric used to form the roof shield may be printed during or after the weaving process used to manufacture the fabric to include a design, image, colors, letters, or other artistic features. For example, the fabric may be imprinted with a design resembling shingles or roof tiles so that when viewed from a distance it is not obvious that a fabric covering the roof. Such printed patterns are not limited to mimicking normal route structures, and may encompass and design that a homeowner may desire. For example, the fabric could be imprinted with the logo of a favorite football team, the name or logo of university, an advertisement, and abstract art designs. Further, the fabric may be dyed to a wide range of colors, enabling homeowners to color their roofs by applying the desired color roof shield.

[0039] The embodiments described above may be implemented on any of a variety of roof types, including, but not limited to, cross-gabled, hipped, mansard, flat, or shed roofs. The foregoing method descriptions and process diagram are provided merely as illustrative examples and are not intended to require or imply that the processes of the various embodiments must be performed in the order presented. Skilled artisans may implement the described functionality in varying ways for each particular roofing system, but such implementation decisions should not be interpreted as causing a departure from the scope of the present invention. Words such as "thereafter," "then," "next," etc. are not intended to limit the order of the processes; these words are simply used to guide the reader through the description of the methods. Further, any reference to claim elements in the singular, for example, using the articles "a," "an" or "the" is not to be construed as limiting the element to the singular.

[0040] The foregoing description of the various embodiments is provided to enable any person skilled in the art to make or use the present invention. Various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without departing from the scope of the invention. Thus, the present invention is not intended to be limited to the embodiments shown herein, and instead the claims should be accorded the widest scope consistent with the principles and novel features disclosed herein.

What is claimed is:

1. A method for implementing a roof shield on top of a roof's surface, comprising:
- measuring dimensions of the roof's surface;
- cutting pieces of a high-albedo fabric to match the dimensions of the roof's surface;
- applying the high-albedo fabric to the roof's surface;
- heat-sealing edges of the high-albedo fabric pieces together as necessary to form one contiguous fabric over the entire roof's surface; and
- securing exterior edges of the high-albedo fabric in a fabric edge clamp attached to the edges of the roof.

2. The method of claim **1**, wherein the high-albedo fabric is SunTex 90% material.

3. The method of claim **1**, wherein the high-albedo fabric is SunTex 90% material with an increased weave density.

4. The method of claim **1**, further comprising cutting the high-albedo fabric to provide a close fit around fixtures and protrusions on the roof's surface.

5. The method of claim **1**, further comprising applying an adhesive to the roof's surface before applying the high-albedo fabric to the roof's surface.

6. The method of claim **5**, wherein the adhesive comprises tar.

7. The method of claim **1**, wherein the fabric edge clamp is secured with a plurality of fasteners to one of an edge surface of the roof, a fascia board, and a soffit.

8. The method of claim **7**, wherein the fabric edge clamp comprises a first strip of rigid material and a second strip of

rigid material, wherein the high-albedo fabric is positioned between the first and second strips of rigid material, and a clamping pressure is applied to the high-albedo fabric by the plurality of fasteners.

9. The method of claim **7**, wherein the fabric edge clamp comprises a first strip of rigid material and a second strip of rigid material, wherein the high-albedo fabric is positioned between the first and second strips of rigid material, and a clamping pressure is applied to the high-albedo fabric by a plurality strip-to-strip fasteners prior to fastening the fabric edge clamp to one of an edge surface of the roof, a fascia board, and a soffit.

10. The method of one of claims **8** and **9**, wherein the high-albedo fabric is further attached to the fabric edge clamp by an adhesive.

11. The method of claim **1**, wherein securing exterior edges of the high-albedo fabric in a fabric edge clamp attached to the edges of the roof comprises:

overlaying a rigid strip over the exterior edges of the high-albedo fabric and an edge of the roof; and

securing the rigid strip to the edge of the roof with a fastener.

12. The method of claim **11**, further comprising applying an adhesive to one of the rigid strip, the exterior edge of the high-albedo fabric, and the edge of the roof prior to securing the rigid strip to the edge of the roof.

13. A roof shield, comprising:

a piece of high-albedo fabric cut to fit dimensions of a roof with openings provided to match locations of fixtures and protrusions of the roof; and

a fabric edge clamp coupled to exterior edges of the high-albedo fabric, the fabric edge clamp configured to securely attach the high-albedo fabric to an edge structure of the roof.

14. The roof shield of claim **13**, wherein the piece of high-albedo fabric comprises multiple smaller pieces heat-sealed together along edges.

15. The roof shield of claim **13**, wherein the high-albedo fabric comprises SunTex 90%.

16. The roof shield of claim **13**, wherein the high-albedo fabric comprises SunTex 90% with increased weave density.

17. The roof shield of claim **13**, wherein the high-albedo fabric comprises a three layer structure, comprising:

a first layer of SunTex 90%;

a second layer comprising an adhesive coupled to the first layer; and

a third layer comprising a removable non-adhesive material configured to protect the second layer from contacting other materials and to be stripped off when the high-albedo fabric is applied to the roof.

18. The roof shield of claim **13**, wherein the fabric edge clamp comprises a first strip of rigid material and a second strip of rigid material, wherein the high-albedo fabric is positioned between the first and second strips of rigid material, and wherein a clamping pressure is applied to the high-albedo fabric by a plurality of fasteners used to attach the fabric edge clamp to the roof.

19. The roof shield of claim **13**, wherein the fabric edge clamp comprises a first strip of rigid material and a second strip of rigid material, wherein the high-albedo fabric is positioned between the first and second strips of rigid material, and wherein a clamping pressure is applied to the high-albedo fabric by a plurality of strip-to-strip fasteners.

20. The roof shield of claim **19**, wherein the fabric edge clamp further comprises an adhesive coupling the high-albedo fabric to one or both of the first and second strips of rigid material.

* * * * *