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(54) **FOLDABLE SHEET FOR FORMING  
SUPPORT STRUCTURE ON ROOF**

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(57) **ABSTRACT**

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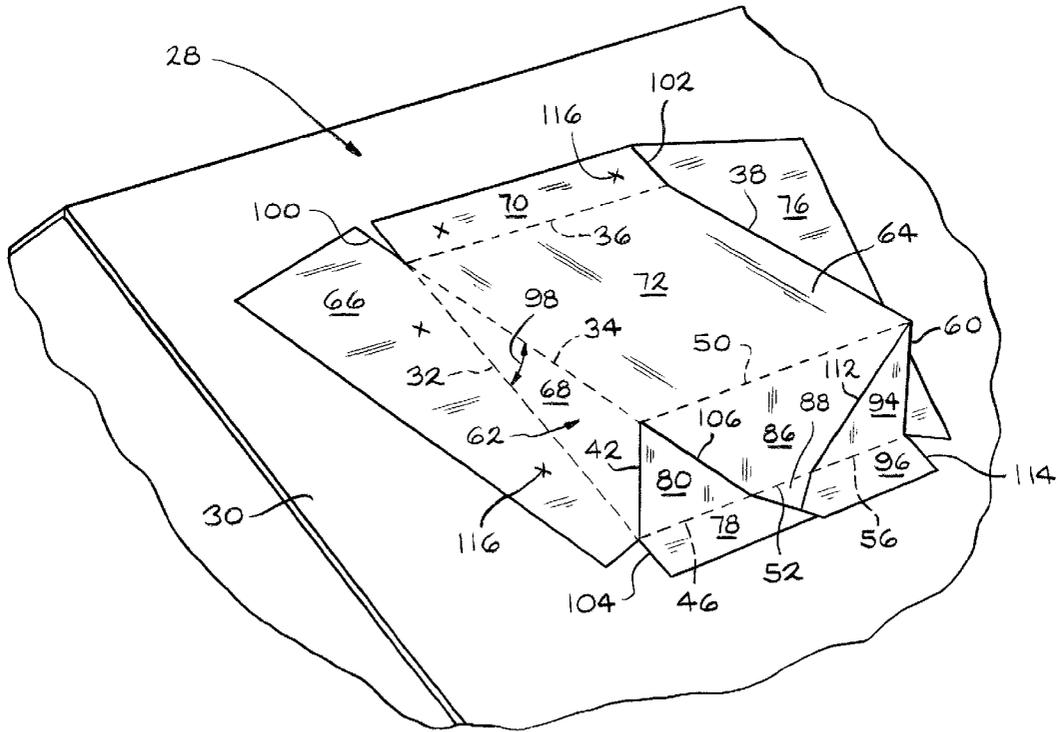
A cardboard or plastic sheet can be folded into a support structure for supporting an object on an inclined roof. The sheet has multiple fold lines which, when used to fold the sheet, form a base for mounting on the roof and a shelf for supporting the object at an angle relative to the roof. A roofing assembly includes bundles of roofing shingles and a sheet between the bundles. The sheet has multiple fold lines which, when used to fold the sheet, form a support structure for supporting an object on an inclined roof.

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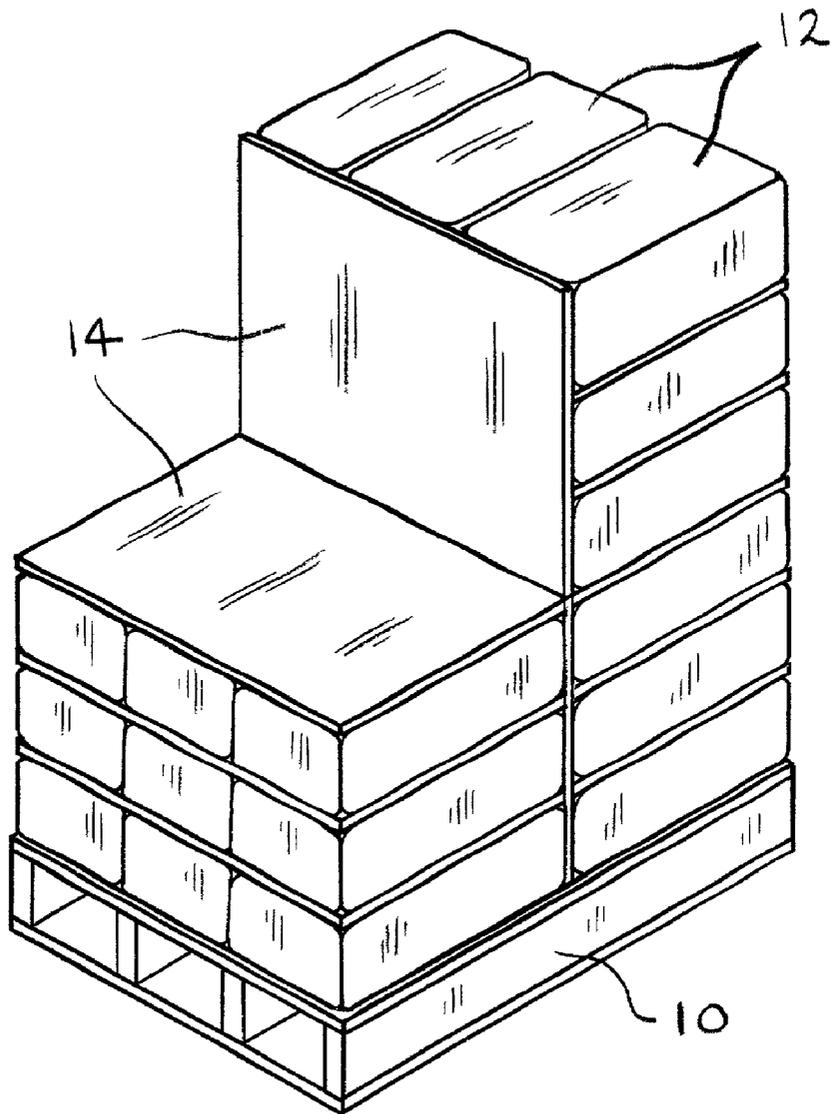
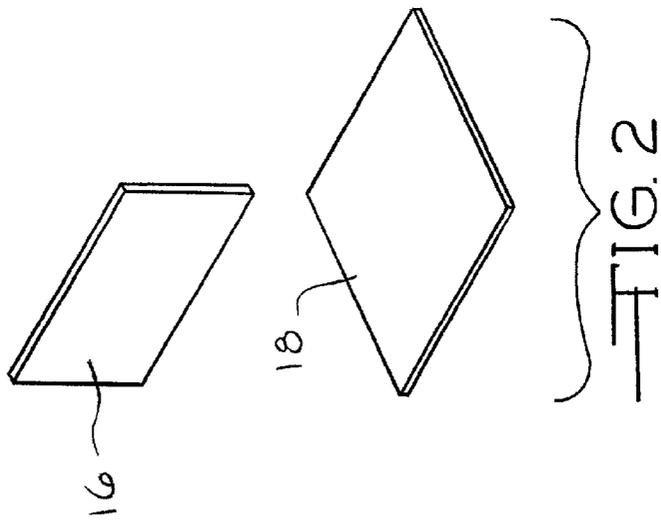
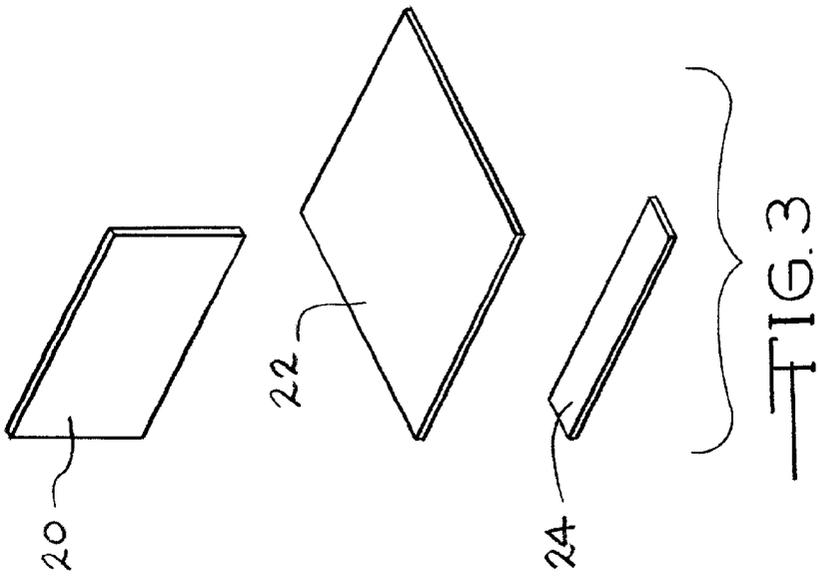


FIG. 1



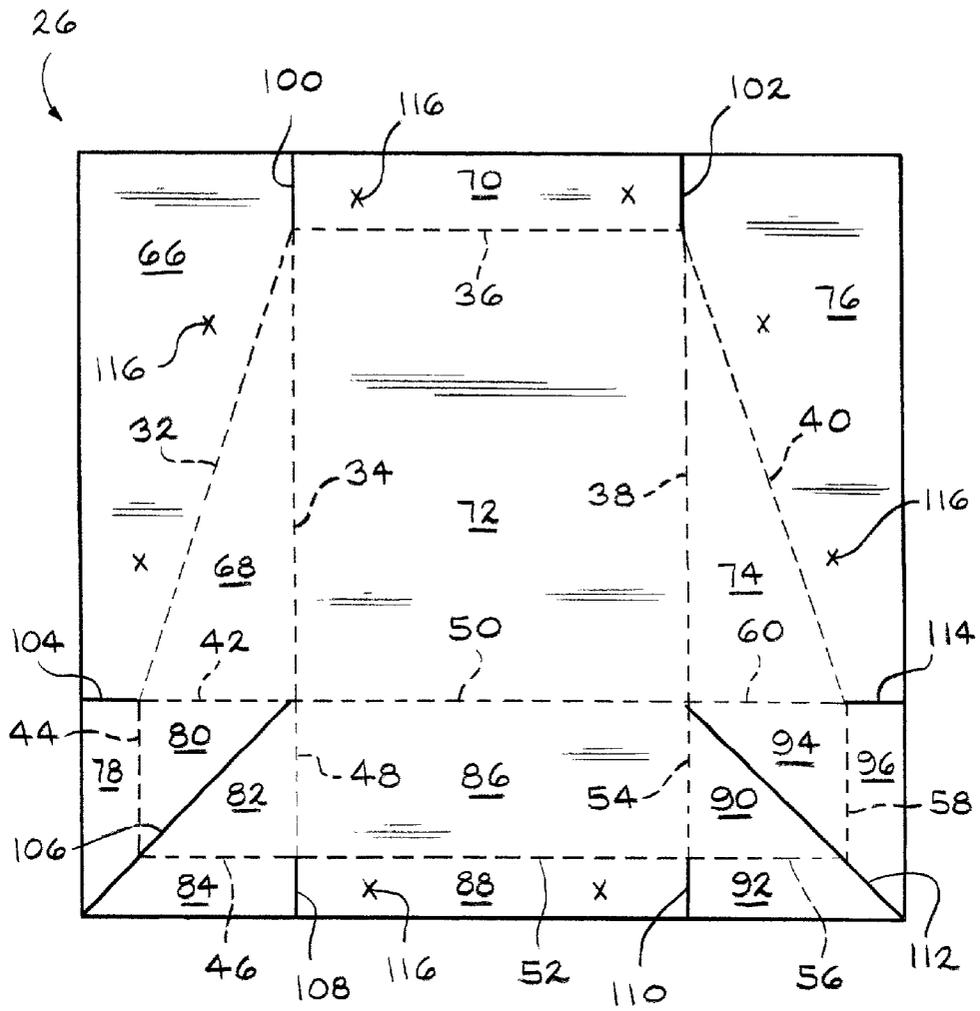


FIG. 4

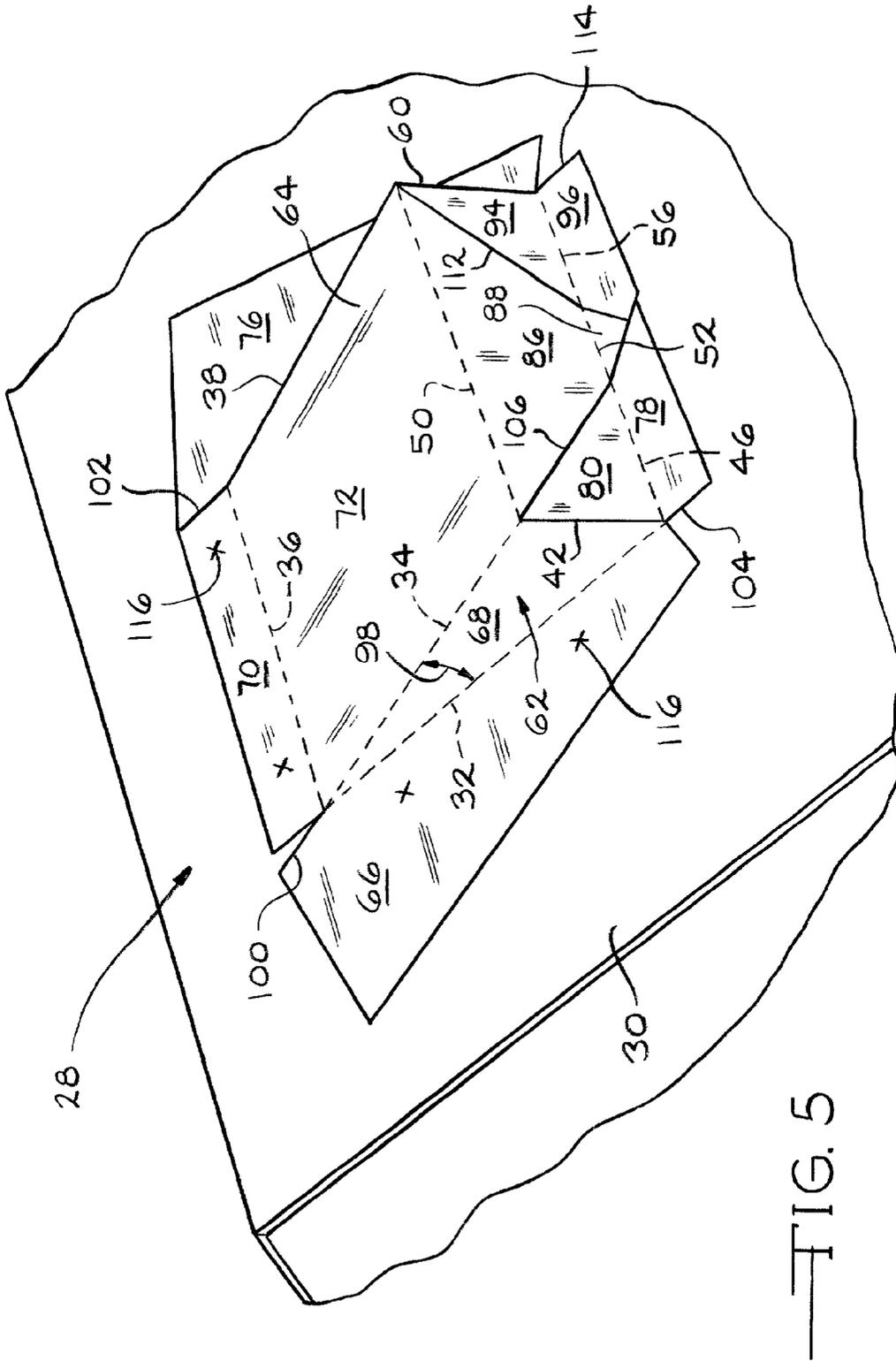


FIG. 5

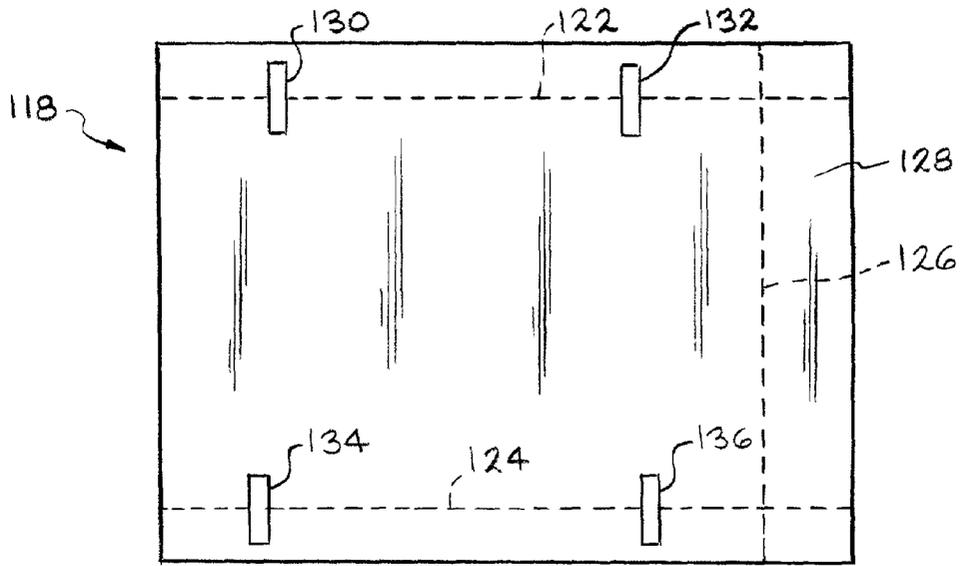


FIG. 6

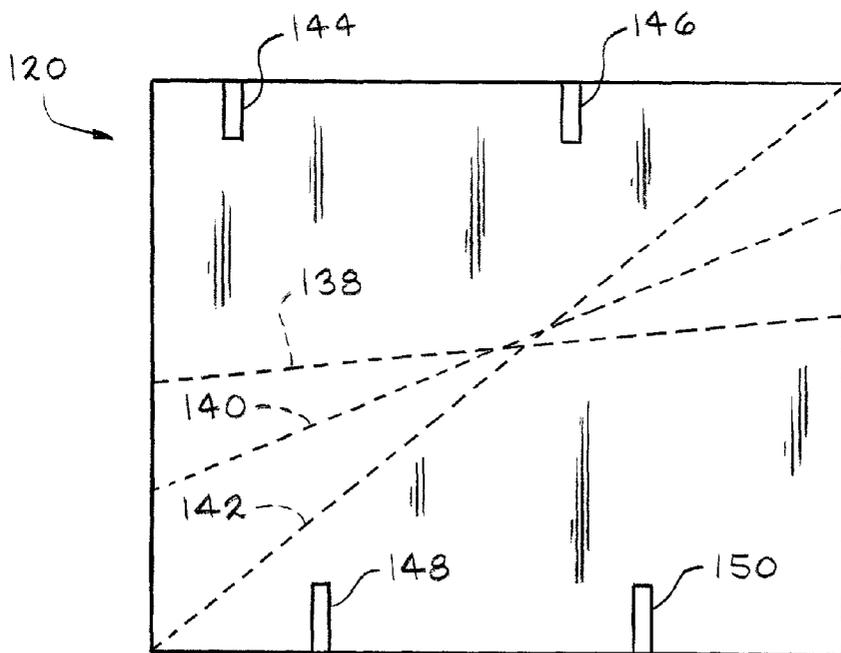


FIG. 7

## FOLDABLE SHEET FOR FORMING SUPPORT STRUCTURE ON ROOF

### TECHNICAL FIELD AND INDUSTRIAL APPLICABILITY OF THE INVENTION

[0001] The present invention is related generally to structures for supporting objects, and more particularly to structures for supporting objects such as roofing shingles on inclined roofs.

### BACKGROUND OF THE INVENTION

[0002] A problem exists in roofing a house in that shingles tend to slide off an inclined roof before they can be secured to the roof. This is particularly a problem with shake, slate and metal roofing shingles because they have a lower coefficient of friction than asphalt shingles. Currently, wooden devices of local contractor design are fabricated to support the shingles on the roof.

[0003] Various patents disclose structures for supporting shingles and other objects on a roof. For example, U.S. Pat. No. 5,165,642 to Rihaly discloses a shingle holder having upwardly extending arms to support the shingles, and apertures for nailing the shingle holder to the roof. U.S. Pat. No. 5,004,072 to Launer discloses a work platform for a roof that can be adjusted to different angles depending on the slope of the roof. U.S. Pat. No. 5,474,271 to Raymond discloses a stand for a roof having a pivoting foot coupled to a planar platform. U.S. Pat. No. 5,887,406 to Bond discloses a support made from foam rubber for holding an object on a roof. U.S. Pat. No. 4,987,720 discloses a non-skid holder for shingles made from sheet metal and having one end upturned to hold the shingles. The patent also discloses that it is known to place paper beneath the shingles to hold them on the roof.

[0004] The known structures for supporting shingles and other objects on a roof are relatively costly and time consuming to construct. Placing paper beneath the shingles is not totally effective in preventing the shingles from sliding off the roof. Therefore, it would be desirable to provide an inexpensive and easily constructed structure for supporting objects such as shingles on an inclined roof.

### SUMMARY OF THE INVENTION

[0005] The above object as well as others not specifically enumerated are achieved by a foldable sheet according to the present invention. The sheet is made predominantly from cardboard or plastic, or combinations thereof. The sheet is adapted to be folded into a support structure for supporting an object on an inclined roof. The sheet has multiple fold lines which, when used to fold the sheet, form a base adapted for mounting on the roof, and a shelf adapted for supporting the object at an angle relative to the roof.

[0006] A roofing assembly according to the invention comprises bundles of roofing shingles and a sheet between the bundles. The sheet has multiple fold lines which, when used to fold the sheet, form a support structure adapted for supporting an object on an inclined roof.

[0007] A support structure according to the invention comprises a sheet made from a material which can be folded by hand. The sheet is folded into a support structure which

includes a base adapted for mounting on the roof, and a shelf adapted for supporting the object at an angle relative to the roof.

[0008] Various objects and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiments, when read in light of the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] **FIG. 1** is a perspective view of a pallet holding bundles of roofing shingles and separator sheets between the bundles.

[0010] **FIGS. 2 and 3** are perspective views of different types of separator sheets which may be used in a pallet holding bundles of roofing shingles.

[0011] **FIG. 4** is a plan view of a separator sheet according to the invention which is adapted to be folded into a support structure for supporting objects on an inclined roof.

[0012] **FIG. 5** is a perspective view of the separator sheet of **FIG. 4** having been folded to form the support structure and mounted on an inclined roof.

[0013] **FIGS. 6 and 7** are plan views of additional embodiments of separator sheets according to the invention, the separator sheets being adapted to be folded, cut and combined with one another to form a support structure.

### DETAILED DESCRIPTION AND PREFERRED EMBODIMENTS OF THE INVENTION

[0014] Referring now to the drawings, there is shown in **FIG. 1** a pallet **10** holding bundles **12** of roofing shingles. The roofing shingles can be any type of shingles, such as three-tab or laminated asphalt shingles, or shake, slate or metal shingles. In a preferred embodiment, the shingles are shake, slate or metal shingles, such as the MiraVista® shingles manufactured by Owens Corning.

[0015] A common practice is to include separator sheets between the bundles of shingles on a pallet to make it easier to remove the bundles from the pallet. **FIG. 1** shows some of the bundles removed from the pallet to expose two separator sheets **14**. Other separator sheets are positioned between the bundles on the pallet. The separator sheets are typically constructed of inexpensive cardboard, and they are usually discarded after the bundles are removed from the pallet.

[0016] Pallets holding different types of shingles may include different numbers, sizes and shapes of separator sheets. For example, **FIG. 2** illustrates two types of separator sheets **16** and **18** which may be used in a pallet of "starter" shingles, with the pallet including three sheets of each type. In one embodiment, the first sheet is about 19 inches (48 centimeters) by 36 inches (91 centimeters) in size, and the second sheet is about 36 inches (91 centimeters) by 36 inches (91 centimeters) in size. **FIG. 3** illustrates three types of separator sheets **20**, **22** and **24** which may be used in a pallet of "field" shingles, with the pallet including three sheets of the first two types and nine sheets of the third type. In one embodiment, the first sheet is about 19 inches (48 centimeters) by 40 inches (102 centimeters) in size, the second sheet is about 40 inches (102 centimeters) by 43

inches (109 centimeters) in size, and the third sheet is about 4 inches (10 centimeters) by 40 inches (102 centimeters) in size.

[0017] As shown in FIGS. 4 and 5, the present invention provides a sheet 26 which is adapted to be folded into a support structure 28 for supporting objects such as shingles on an inclined roof. In a preferred embodiment, the sheet is also adapted for use as a separator sheet for separating bundles of shingles on a pallet. A sheet which doubles as a separator sheet and a support structure is inexpensive and disposable, and is delivered conveniently to the roofing site along with the shingles. Whereas a conventional separator sheet is useless after unpacking the shingle bundles, the present invention converts the separator sheet into something which is useful for constructing into a support structure for holding objects on a roof. The sheet is relatively easy to construct into the support structure. Roofers do not have to fabricate wooden devices at the roofing site for supporting the shingles.

[0018] It should be noted that while the preferred embodiment of the sheet 26 doubles as a separator sheet, the invention is not limited to the use of separator sheets. Any suitable sheet can be used in the invention. The sheet can be made from any material which, when constructed into a support structure 28, is suitable for supporting objects such as shingles on an inclined roof. Advantageously, the sheet is made from a material which can be folded by hand, so that the roofer can easily and quickly construct the support structure. Preferably, the sheet is made predominantly from cardboard or plastic, or combinations thereof. The cardboard or plastic may be relatively thick for added strength and stiffness. The sheet may also include reinforcement materials for stiffening and strength, and/or waterproofing materials to make the sheet more weather resistant. For example, a cardboard sheet may be impregnated or coated with wax to make it stiffer and water resistant. Alternatively, the sheet can be made of wood or composite materials, or a combination of materials to provide one or more properties described herein, including strength and/or foldability. The sheet can be any size and shape which is suitable for supporting the objects.

[0019] FIG. 4 shows the sheet 26 before it has been constructed into the support structure, and FIG. 5 shows the sheet after it has been constructed into the support structure 28 and mounted on a roof 30. The sheet is premarked with multiple fold lines 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 54, 56, 58 and 60. When the sheet is folded along the fold lines, the sheet is converted into a three-dimensional structure which forms at least a portion of the support structure. In the embodiment shown in FIGS. 4 and 5, the folded sheet 26 forms the entire support structure 28, while in the embodiment shown in FIGS. 6 and 7 (described below), two different sheets are used to form the support structure. The fold lines can be any lines which indicate the locations for folding the sheet. For example, the fold lines can be printed, embossed or perforated lines. In the illustrated embodiment, the fold lines are dotted lines which are printed on the sheet. Typically, certain of the fold lines are designed for the sheet to be folded down during construction of the support structure, while other of the fold lines are designed for the sheet to be folded up. In the illustrated embodiment, the sheet is folded down along the fold lines 34, 38, 42, 46, 50, 56 and 60 during construction of the support structure, and folded

up along the fold lines 32, 36, 40, 44, 48, 52, 54 and 58. The sheet can include printed instructions (not shown) such as "fold up" and "fold down" along the fold lines to indicate how the sheet should be folded.

[0020] Preferably, the support structure 28 formed from the sheet includes a base 62 adapted for mounting the support structure on the roof 30, and a shelf 64 adapted for supporting the roofing shingles or other objects at an angle relative to the roof. As shown in FIG. 5, the shelf 64 is comprised of portion 72 of the sheet, and the base 62 is comprised of the remaining portions of the sheet. The shelf 64 is oriented at an angle 98 relative to the pitch of the roof 30, so that the shelf is oriented approximately horizontally to keep the objects from sliding off the shelf. Preferably, the shelf is oriented within about 20 degrees up or down from horizontal, and more preferably within about 10 degrees. Optionally, the shelf can be provided with a surface having a high coefficient of friction (not shown) to retard sliding of the objects.

[0021] It is advantageous to provide support structures which are adapted to work on different roofs having different pitches. In the illustrated embodiment, the support structure 28 is adapted to work on a roof 30 having what is known as a "4:12" pitch, but the support structure could have a different design for roofs having other pitches. One approach (not shown) to providing for roofs having different pitches is to include multiple sheets in a pallet designed to construct shelves which are angled differently relative to the bases. Another approach (not shown) is to provide a single sheet with multiple fold lines at different angles, with different fold lines being used for folding the sheet depending on the pitch of the roof.

[0022] The sheet usually has one or more cut lines 100, 102, 104, 106, 108, 110, 112 and 114. The cut lines can be pre-cut during manufacture of the sheet. The cut lines can also indicate locations for cutting the sheet during construction of the support structure. For example, the cut lines can be printed, embossed or perforated lines. In the illustrated embodiment, the cut lines are solid lines which are printed on the sheet. Preferably, the cut lines are different from the fold lines so that the roofer can easily determine which lines are to be cut and which lines are to be folded. The sheet can include printed instructions (not shown) such as "cut" along the cut lines. It is anticipated that the cut lines can be cut easily by the roofer at the roofing site, for example with a box knife or a utility knife.

[0023] Preferably, the sheet has at least one foot portion which, when the sheet is folded, is adapted for holding the support structure on the roof. In the illustrated embodiment, the sheet has first and second foot portions 66 and 76 on opposite sides of the support structure 28, a third foot portion 70 at the upper end of the support structure, and a fourth foot portion (formed by portions 78, 84, 88, 92 and 96 of the sheet) at the lower end of the support structure. The foot portions rest on the roof 30 to hold the support structure 28 in place. Optionally, the foot portions can be provided with a surface having a high coefficient of friction (not shown) to assist in holding the foot portions on the roof.

[0024] Also optionally, the sheet can have one or more marks 116 such as X's on the foot portions which indicate locations for the insertion of fasteners (not shown) to

facilitate holding the foot portions on the roof. The sheet can include printed instructions (not shown) such as “nail here” next to the marks.

[0025] The sheet could also be designed such that, when folded, it forms reinforcement ribs (not shown) to increase the strength and stiffness of the support structure. The sheet could also have tabs (not shown) that lock together the ribs. Tabs could also be used to hold together various parts of the base.

[0026] In the embodiment shown in **FIGS. 6 and 7**, two different sheets **118** and **120** are provided which are adapted to be folded, cut and combined with one another to form a support structure (not shown). The first sheet **118** is adapted to be folded to form the shelf of the support structure. It has a pair of fold lines **122** and **124** along opposite sides of the sheet along which the sheet is folded down during construction of the shelf. The first sheet also has another fold line **126** near one end of the sheet. The end portion **128** of the first sheet is folded up along this fold line **126** to form an upwardly extending stop portion of the shelf. The stop portion is adapted for restraining the object held on the shelf when the shelf is not completely horizontal, to prevent the object from sliding off the shelf. The embodiment illustrated in **FIGS. 4 and 5** could also be designed to form a stop portion (not shown).

[0027] The first sheet **118** also has a first pair of tabs **130** and **132** on one side of the sheet, and a second pair of tabs **134** and **136** on the other side of the sheet. The purpose of the tabs will be described below. The tabs can have printed or perforated outlines for cutting or pressing out by the roofer, or they can be precut in the sheet.

[0028] In the illustrated embodiment, the second sheet **120** is adapted to be cut to form the base of the support structure. Specifically, the second sheet has multiple cut lines **138**, **140** and **142** oriented at different angles on the sheet. One of the cut lines is cut to divide the sheet into opposing sides of the base. Advantageously, the different angled cut lines allow the construction of different angled bases which can compensate for roofs having different pitches.

[0029] The second sheet **120** also has a first pair of tabs **144** and **146** on one side of the sheet, and a second pair of tabs **148** and **150** on the other side of the sheet. The first pair of tabs **144** and **146** of the second sheet **120** are adapted to be interlocked with the first pair of tabs **132** and **130**, respectively, of the first sheet **118** to lock the first side of the base to one side of the shelf. Similarly, the second pair of tabs **148** and **150** of the second sheet **120** are adapted to be interlocked with the second pair of tabs **136** and **134**, respectively, of the first sheet **118** to lock the second side of the base to the other side of the shelf.

[0030] The principle and mode of operation of this invention have been described in its preferred embodiments. However, it should be noted that this invention may be practiced otherwise than as specifically illustrated and described without departing from its scope. For example, while the invention has been illustrated as sheets for forming support structures to be mounted on the side of a roof, the invention is also applicable to sheets for forming support structures to be mounted on the peak of a roof. While the invention has been illustrated as a single sheet or two sheets for forming a support structure, the invention could also use

additional sheets. For example, a sheet could be provided which forms a center support below the shelf on the roof. Although the fold lines and the cut lines are shown as straight lines, they do not have to be straight.

What is claimed is:

1. A sheet made predominantly from a material selected from cardboard and plastic, and combinations thereof, the sheet being adapted to be folded into a support structure for supporting an object on an inclined roof, the sheet having multiple fold lines which, when used to fold the sheet, form a base adapted for mounting on the roof and a shelf adapted for supporting the object at an angle relative to the roof.

2. A sheet according to claim 1 further having a cut line which is pre-cut during manufacture of the sheet, or which is adapted for cutting during construction of the support structure.

3. A sheet according to claim 1 further having a foot portion which, when the sheet is folded, is adapted for holding the support structure on the roof.

4. A sheet according to claim 3 further having a mark on the foot portion indicating a location adapted for insertion of a fastener.

5. A sheet according to claim 1 further having a stop portion which, when the sheet is folded, is adapted for restraining the object.

6. A roofing assembly comprising bundles of roofing shingles and a sheet between the bundles, the sheet having multiple fold lines which, when the sheet is folded, form at least a portion of a support structure adapted for supporting an object on an inclined roof.

7. A roofing assembly according to claim 6, wherein the support structure includes a base adapted for mounting on the roof and a shelf adapted for supporting the object at an angle relative to the roof.

8. A roofing assembly according to claim 6, wherein the sheet further has a cut line which is pre-cut during manufacture of the sheet, or which is adapted for cutting during construction of the support structure.

9. A roofing assembly according to claim 6, wherein the sheet further has a foot portion which, when the sheet is folded, is adapted for holding the support structure on the roof.

10. A roofing assembly according to claim 6, wherein the sheet further has a stop portion which, when the sheet is folded, is adapted for restraining the object.

11. A roofing assembly according to claim 6, wherein the sheet is made predominantly from a material selected from cardboard and plastic, and combinations thereof.

12. A roofing assembly according to claim 6, wherein the sheet is a first sheet which forms a first portion of the support structure, and further comprising a second sheet between the bundles, the second sheet having a line which, when cut or used to fold the sheet, forms a second portion of the support structure.

13. A roofing assembly according to claim 12, wherein one of the first sheet and the second sheet forms a base adapted for mounting on the roof, and the other of the first sheet and the second sheet forms a shelf adapted for supporting the object at an angle relative to the roof.

14. A roofing assembly according to claim 12, wherein the first sheet and the second sheet have tabs adapted for locking the sheets together.

**15.** A support structure for supporting an object on an inclined roof comprising a sheet made from a material which can be folded by hand, the sheet being folded into a support structure which includes a base adapted for mounting on the roof and a shelf adapted for supporting the object at an angle relative to the roof.

**16.** A support structure according to claim 15, wherein the sheet is cut during construction of the support structure.

**17.** A support structure according to claim 16, wherein the sheet has lines to indicate locations for folding and cutting.

**18.** A support structure according to claim 15, wherein the support structure has a foot portion which, when the sheet is folded, is adapted for holding the support structure on the roof.

**19.** A support structure according to claim 15, wherein the support structure has a stop portion which, when the sheet is folded, is adapted for restraining the object.

**20.** A support structure according to claim 15, wherein the sheet is made predominantly from a material selected from cardboard and plastic, and combinations thereof.

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