March 2, 1971 B. R. WHITE 3,566,562

PACKING ARRANGEMENTS FOR ROOFING ELEMENTS AND PROCESS

Filed Sept. 19, 1968 3 Sheets-Sheet 1

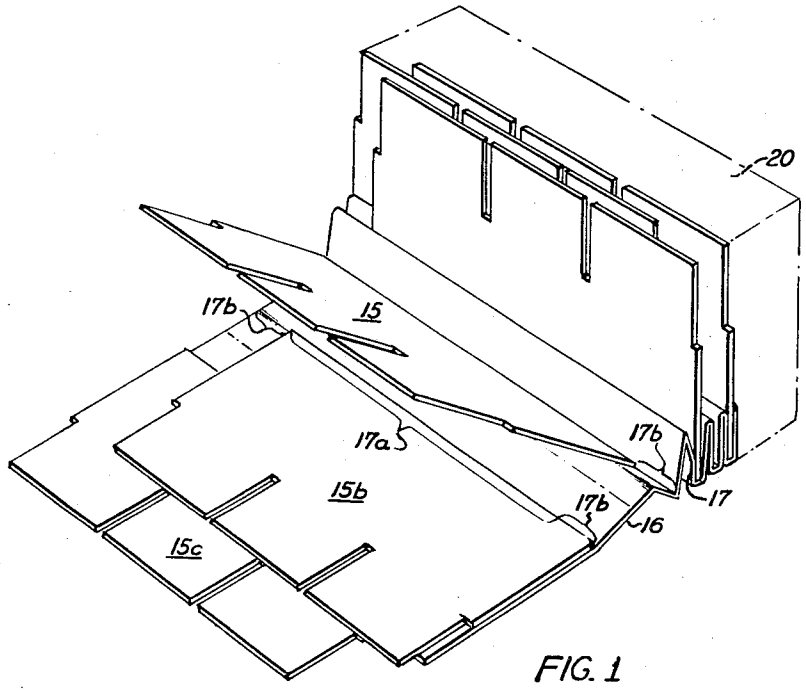


FIG. 1

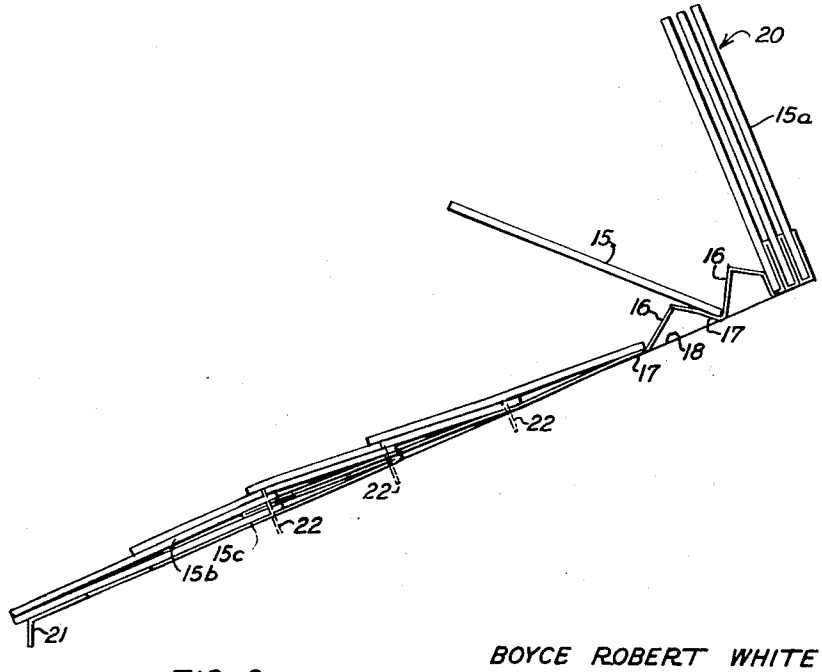


FIG. 2

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PACKING ARRANGEMENTS FOR ROOFING ELEMENTS AND PROCESS

Filed Sept. 19, 1968 3 Sheets-Sheet 2

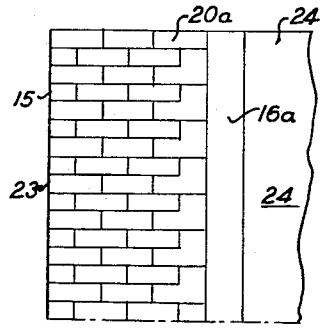


FIG. 3

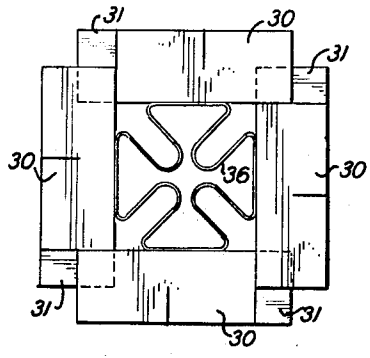


FIG. 4

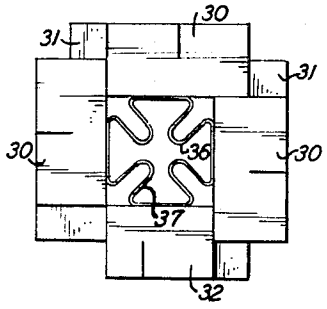


FIG. 5

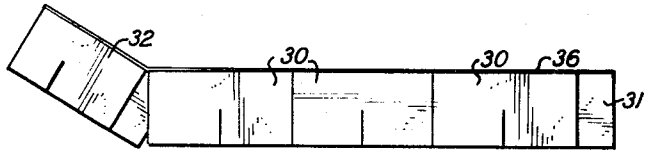


FIG. 6

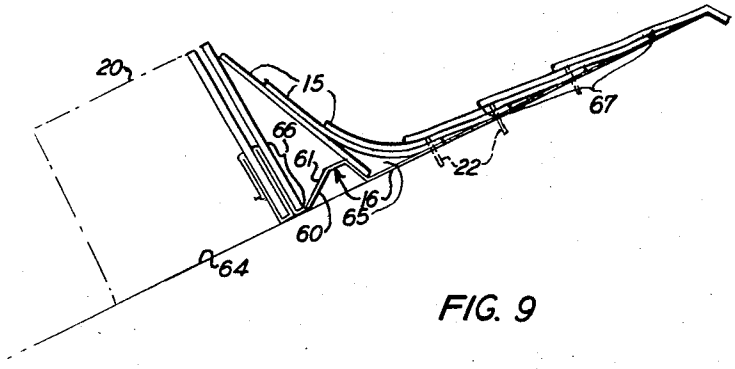


FIG. 9

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March 2, 1971 B. R. WHITE 3,566,562

PACKING ARRANGEMENTS FOR ROOFING ELEMENTS AND PROCESS

Filed Sept. 19, 1968 3 Sheets-Sheet 3

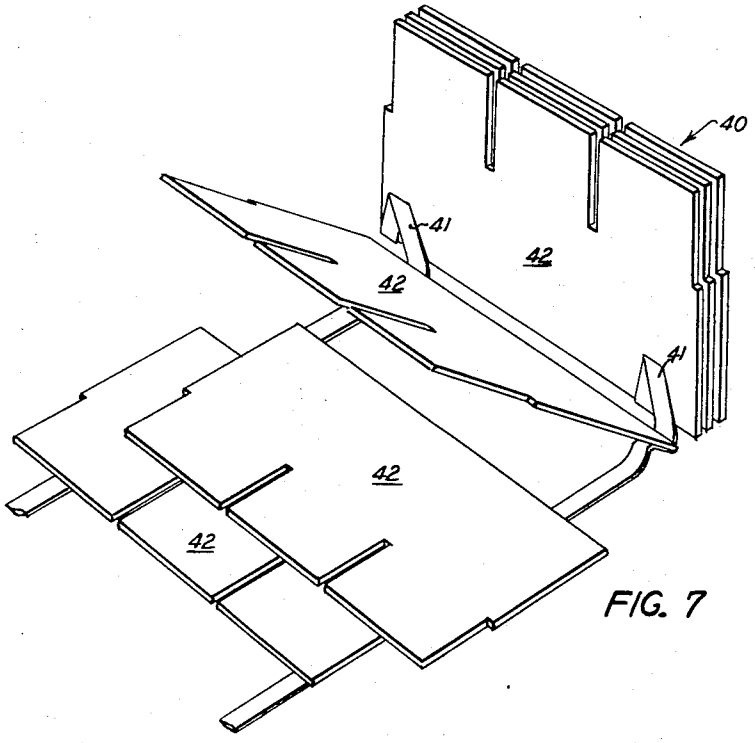


FIG. 7

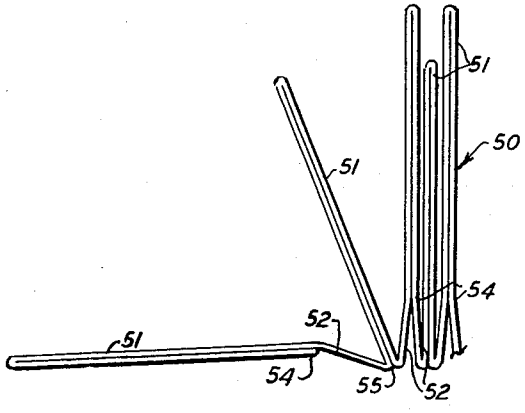


FIG. 8

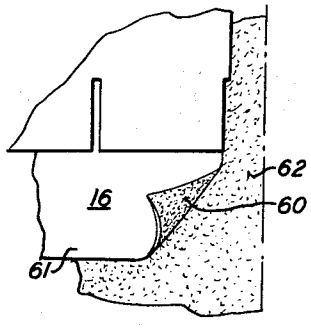


FIG. 10

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United States Patent Office 3,566,562 Patented Mar. 2, 1971

3,566,562

PACKING ARRANGEMENTS FOR ROOFING ELEMENTS AND PROCESS

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Filed Sept. 19, 1968, Ser. No. 760,765
Int. Cl. E04d 1/28, 3/365
U.S. Cl. 52—173 24 Claims

ABSTRACT OF THE DISCLOSURE

A packaging arrangement for shingles to be applied to a sloping roof or the like wherein the shingle elements are secured together in their upper portions, relative to the slope of the roof, by pleated connections which can be opened in an accordion fashion and, as connected, packaged and transported to the roof deck to be shingled. There, the leading shingle member is connected to the roof's ridge and the trailing shingle member is pulled down the slope of the roof deck to the eaves with the pleated connections thereby being opened and drawn to lie flat against the roof deck, the intermediate shingles overlapping each other in a conventional manner. Several arrays of such shingle members are packaged together with laterally extending overlapping portions of adjacent arrays interwoven, the interwoven arrays being transported as a unit and placed on the roof simultaneously where, if not previously aligned, they are straightened out along the roof ridge, still however, interwoven. Then, after the leading shingles are secured, the entire unit of arrays is pulled down the roof deck. The pleated connecting member is made of a material suitable for the intermediate layer between the roof deck and the shingles—a function conventionally provided by a felt layer. A laterally extending portion from the connecting member can be provided for each array so that there is a substantial overlapping of such intermediate layers of adjacent arrays. Instead of a pleated connecting member, other suitable folding members may be provided between adjacent shingle members and such folding members may also provide for a lateral displacement of every other shingle member when the folding members are aligned by pulling the array down the roof deck.

BACKGROUND OF THE INVENTION

The invention relates to an improved system of applying roofing materials to roof decks having a measurable slope. More particularly, the invention relates to the prepackaging of the roofing elements so that they can be applied to the roof deck with considerably more facility than is now possible through conventional roofing methods.

At present, if a new roof is not to be applied directly over an old roof, the old shingles and the underlying felt are manually removed down to the wood deck of the section intended to be roofed. Once a section of roof is so removed, a new roof must be applied as soon as possible to avoid complications and damage which may result from precipitation on an unshingled roof deck. However, conventional roofing methods now in popular use frequency preclude the expeditious laying of the shingles and unanticipated adverse weather conditions may cause considerable damage in a house where the roof has been removed. In this connection, it must be appreciated that where any likelihood at all of rain exists, the risk involved

discourages the removal of an existing roof for the purposes of applying a new roof.

The present conventional method of shingling a roof essentially comprises the initial step, after the old roofing is removed, of applying a roofing felt, usually a saturated asphalt felt, in horizontal strips to the roof section involved. Then, after the roofing felt has been laid, the roof must be measured and chalklines struck vertically and horizontally to assure proper alignment of the shingles. Next, with the chalklines laid out, the shingle members are applied manually one at a time by holding the top of the shingle to a horizontal chalkline and the end of the shingle to a vertical chalkline and at the same time fastening it with nails or other fastener devices. From this it will be understood that the job, if done properly, is a tedious and painstaking one. One method of speeding up the process has been described in my copending application, Ser. No. 599,168, filed Dec. 5, 1966 now Pat. No. 3,438,170. This application discloses a mechanism for applying individual shingles and securing same in place in their proper location on a roof with great rapidity. Although such apparatus and method is commercially advantageous over known conventional methods of roofing, still the entire section to be roofed must have the old shingles removed and the danger which exists from intervening adverse weather is only alleviated to some extent by the speed of the process. In addition, the invention set forth in that application requires the use of and some familiarity with apparatus which is connected to the roof section involved.

It is the object of the instant invention to provide a system wherein shingle members can be applied with even more rapidity and ease than is possible with the system disclosed in the above-noted copending application, and to permit same without the necessity of erecting special apparatus over the roof section involved and, moreover, to minimize difficulties and dangers which may arise because of unanticipated precipitation.

SUMMARY OF THE INVENTION

The above problems are solved by prepositioning the shingles in a package with a connecting member attached to the upper portion of the shingles in an accordion-like fashion. With such packages, there is no necessity to remove the entire section to be roofed at a time. Instead, a downwardly disposed strip approximately the width of the packaged array is removed and with the leading shingle member attached to the roof ridge, the accordion-like connecting member, together with the shingle member attached thereto is pulled down the roof in a short period of time thus covering the exposed roof deck. The array of shingles is then quickly secured in place and a next path of old shingles may be removed for the next array. If foul weather should occur while the roofing process is taking place, with the system of the invention, the small portion of the roof which would be otherwise exposed can be covered by the succeeding array and secured sufficiently in place until there is more favorable weather for roofing.

A certain expansibility inherent in the accordion-like connecting member permits adapting the various arrays to imperfections in the roof and, moreover, the connecting member may also serve as an intermediate waterproofing or insulating layer or both between the shingles and the roof deck.

The array is such that it can be cut with a roofing knife or other appropriate cutting means so as to be received by almost all conceivable areas of the roof.

The invention can also be utilized as vertically disposed shingle siding.

With a single connecting member for an array of shingles, there is a lateral displacement of every other shingle member of the array in the package. This circumstance permits the interweaving of adjacent shingle arrays in the packaged form, whereby for a more speedy roofing of large areas, it is possible to set up in a convenient manner and to pull down several interwoven arrays simultaneously.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, adaptabilities and capabilities of the invention will appear as the description progresses, reference being had to the accompanying drawings, in which:

FIG. 1 shows in perspective an array of shingle members which have been partly opened to illustrate how the shingle members are connected together;

FIG. 2 is a side view of an array showing the trailing shingles connected to the roof deck;

FIG. 3 is a side elevational view showing an array of shingle members in accordance with the invention on a roof deck with a laterally extending connecting member;

FIG. 4 is a top view of four shingle arrays interwoven into a packaged unit;

FIG. 5 is a top view similar to FIG. 4 except that one of the arrays is predesigned to be applied to the edge of the roof;

FIG. 6 is a top view of the arrays shown in FIG. 5 being brought in position to be opened and drawn down simultaneously on a roof deck;

FIG. 7 is a perspective view similar to FIG. 1 disclosing an alternate method of connecting adjacent shingle members;

FIG. 8 is a side view showing a further modified form of the connected shingle members;

FIG. 9 is a side view showing an array with the leading shingles attached to the roof's ridge, the assembly being secured to the roof deck by bonding material; and

FIG. 10 illustrates the application for the bonding material to the assembly shown in FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2, the roofing elements comprise the shingle member **15** which is a conventional twelve by thirty-six inch asphalt strip shingle. Each such shingle member **15** is connected at its upper edge, relative to the slope of the roof, to limiting means comprising a foldable member of reinforced asphalt-impregnated scrim **16** or other suitable composition which can include heat insulating material. It will be noted that the scrim **16** is folded in a pleated or accordion-like fashion and has a shingle member **15** attached to it at regular intervals **17** by glue or other appropriate securing means. Preferably the location of the securing interval **17** is on the underside of the shingle member **15** and at its upper aspect relative to its position on the roof deck **18**. However, for certain purposes, it is preferable to secure the shingle **15** to the scrim **16** at its upper edge. When folded, the shingle members **15** are in an array designated **20** and the scrim **16** is folded between adjacent shingle members **15** in the array **20**. The top shingle **15***a* of the array is considered to be the leading shingle, and the last shingle **15***c* is considered the trailing shingle. In most applications, the trailing shingle **15***c* is doubled with the next-to-last shingle **15***b*. A metallic or plastic eave drip **21** may, if desired, be attached to the trailing shingle **15***c*.

In applying the shingles to an already roofed section, first a path of shingles slightly greater than the width of the array **20** is removed and the leading shingle **15***a* of the array is attached to the ridge of the roof. The array **20** is then pulled away from the roof ridge down the cleared path of the slope of the roof to a position where the next-to-last shingle **15***b* overlaps the edge of the roof. If the array **20** is too long for this purpose, it is necessary to remove one or several of the last shingles **15**. The shingle **15***c* is then doubled under shingle **15***b* by sliding it to a position as shown in FIG. 2. The array **20** may next be secured in place to the roof deck **18** by staples **22** or other appropriate securing means. It will be appreciated that, if desired, the shingles **15***b* and **15***c* can first be secured and the array **20** moved upwardly along the roof deck **18** whereby the leading shingle **15***a* is subsequently secured to the ridge of the roof. This method, however, is not preferred since it is easier initially to place the prepackaged array **20** at the top of the roof and to take advantage of gravity by moving same down the roof deck **18** to the eaves.

FIG. 3 illustrates an array **20***a* which has been laid out at the edge **23** of a roof **24**. However, the array **20***a* differs from array **20** in that there is a laterally extending piece of scrim **16***a* projecting substantially beyond the edge of the shingle members **15** to provide an increased area for overlapping the scrim areas of adjacent arrays. The extension **16***a* is advantageous in that it provides an area to which a sealing material is spread before the succeeding array is laid down over same to insure that there will be no leakage between the adjacent scrim coverings.

It will be understood that even without an extension **16***a*, there still is a certain amount of overlap of scrim **16** due to the necessary interweaving of adjacent arrays. Because of this overlap, the glue applied to interval **17** is applied only the length of span **17***a* and not to the overlapping spans **17***b* (see FIG. 1). If desired, the thickness of scrim **16** along the spans **17***b* of overlap may be one-half that through span **17***a*.

Where a lateral extension such as **16***a* is provided, it may be often desirable to underlap the scrim on the opposite side of the array by a distance equivalent to span **17***b*.

Referring now to FIGS. 4, 5 and 6, it will be noted that tweleve by twenty-four inch asphalt strip shingles, which are set up in arrays such as shown in FIG. 1, may have their laterally extending portions **31** interwoven so that together they form a rectangular packaged unit which can be palletized and easily moved by a forklift truck or other suitable means. FIG. 5 shows a construction similar to FIG. 4 except that one of the arrays **32**, which is meant for the edge of the roof, does not have laterally extending portions **31** to its left as seen in the figure. When a plurality of arrays such as shown in FIG. 5 are taken to the top of the roof, they can be aligned on the rof while still interwoven as shown in FIG. 6, the edge array **32**, however, not being completely closed on the roof. Alternatively, they can be aligned prior to being conveyed to the roof and subsequently conveyed to the roof in such condition wherein the leading shingle of each of the arrays is attached to the ridge of the roof and an elongated eave drip (such as eave drip **21**, except longer) is attached to the trailing and the next-to-last shingles. Then by pulling the eave drip downwardly along the slope of the roof, the arrays **30** and **32** are simultaneously opened to cover the roof section involved. Cord **36** connects to the leading shingles of arrays **30** and **32** and limits the amount such arrays can be parted without cutting the cord. Before the unit shown in FIG. 5 is aligned as shown in FIG. 6, the cord **36** is cut at approximately location **37**.

In FIG. 7, an array **40** has a pair of connecting members **41** which are each connected to each shingle **42** in a staggered manner in the packaged array **40** so that upon opening and alignment of the connecting member **41** the individual shingles **42** are automatically staggered laterally along the roof deck. A roof deck in such case should already have an underlayer applied, if an underlayer is desired. But for many applications, an underlayer is not considered necessary. Alternatively, connecting members such as **41** may be connected to every other

shingle 42 without being staggered, whereby there would be four members 41, two for each alternate set, and the alternate sets are offset relative to each other in the desired staggered position when ready for application.

FIG. 8 shows a further embodiment wherein the shingle members 51 of the array 50 are staggered vertically. The connecting members 52 in such case may be made of the same material as the shingles but adapted to bend particularly at locations 54 and 55 adjacent the shingle 51, per se. The advantage of this system is that it permits the utilization of a continuous webbing for both the shingle 51 and the connecting members 52, the shingle member 51 consisting of the bent-over connecting member 52 which is glued between adjacent locations 54 and between adjacent locations 55 or otherwise secured together to give it a double thickness. Such shingles are staggered in plan by cutting so that they interlock when applied to a roof.

An alternative method of connecting shingles 15 of array 20 to a deck is illustrated with references to FIGS. 9 and 10. The scrim 16 has had previously applied thereto on its under surface 60 and, if desired, also on its upper surface 61, a curing agent which is in a dry or not unduly tacky form and which is adapted to cure at ambient temperatures a liquid epoxy resin 62 applied to the deck 64 immediately prior to installation of the array 20 of shingles 15 thereon. If the upper surface 61 of the scrim 16 also has the curing agent applied thereto, the shingles 15 are further secured to scrim 16 by spraying the liquid epoxy resin into space 65 under shingle 15 at the time of installation. Still further, by applying the curing agent to the after portions 66, or alternatively to the under sides 67, of shingles 15 and, on installation, spraying liquid epoxy resin under shingles 15, they are bonded together to form a monolithic roof structure without losing the advantages of individual shingle units. If desired, staples 22 may be employed in the conventional manner to augment the bond of shingles 15 to roof deck 64.

Instead of epoxy with a curing agent, any other suitable gluing or adhesive agent may be employed since my invention is particularly adaptable to incorporating securing means of this type. This is of considerable import since the system disclosed makes feasible and practicable the securing of shingles to a roof deck without piercing or puncturing them and the roof deck with nails, staples or the like. Most leaks result from puncturing shingles with various fasteners heretofore conventional and necessary to secure the shingles in place.

Manufacture of an array 20 as shown in FIG. 1 may be accomplished by the steps of first pleating or appropriately folding scrim 16, next inserting a shingle 15 into each pleat alternately staggered as illustrated in FIG. 1, and finally securing the shingles 15 to scrim 16. The array 20 is then ready to be packaged.

Manufacture of the array may be accomplished with the use of jigs or by machine as would occur to one skilled in the art.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A packaging arrangement for roofing elements for application to a sloping roof or sides of a building in overlapping echelon which comprises

covering elements (15, 42, 51) for said overlapping echelon, and

foldable limiting means (16, 41, 52) directly secured to the underside of each of said elements for limiting the relative movement between adjacent elements, whereby said elements may be moved from a packaged position (20, 40, 50) to an overlapping echelon position with said limiting means automatically limiting the relative movement of adjacent elements in moving from said packaged position to said overlapping echelon position by an amount equal to the predetermined overlap of said elements on said building.

2. The packaging arrangement of claim 1 wherein said limiting means comprises foldable members (16, 41, 52) connected to adjacent of said roof elements.

3. The packaging arrangement of claim 2 wherein said foldable members comprise a continuous flexible member (16) which is secured to the upper aspects of each of said roof elements, said flexible member being pleated in said packaged position.

4. The packaging arrangement of claim 3 wherein said flexible member forms an underlay between said covering elements and the deck therefor.

5. The packaging arrangement of claim 4 wherein said flexible member includes a laterally extending portion (16*a*).

6. The packaging arrangement of claim 2 wherein said foldable member is secured directly to each of said covering elements at two laterally spaced locations.

7. The packaging arrangement of claim 2 wherein said foldable member is folded between each of said covering elements in the packaged position.

8. The packaging arrangement of claim 1 wherein said covering elements are alternately laterally offset in the packaged position.

9. The combination of a building roof deck and a packaging arrangement for roofing elements for application to said roof deck in overlapping echelon which comprises

covering elements for said overlapping echelon and limiting means on each of said elements for limiting the relative movement between adjacent elements whereby said elements may be moved from a packaged position to an overlapping echelon position with said limiting means automatically limiting the relative movement of adjacent elements and moving from said packaged position to said overlapping echelon position by an amount equal to the predetermined overlap of said elements on said building, adhesive means being applied between said covering elements and said roof deck to secure said covering elements thereon.

10. The combination of a building roof deck and a packaging arrangement for roofing elements for application to said roof deck in overlapping echelon which comprises covering elements for said overlapping echelon and limiting means on each of said elements for limiting the relative movement between adjacent elements whereby said elements may be moved from a packaged position to an overlapping echelon position with said limiting means automatically limiting the relative movement of adjacent elements and moving from said packaged position to said overlapping echelon position by an amount equal to the predetermined overlap of said elements on said building, a first substance being applied to the limiting means which is adapted to react with a second substance applied to the roof deck of said building to form a bond between said covering elements and said roof deck.

11. The packaging arrangement of claim 10 wherein said first substance is a curing agent and said second substance is a liquid epoxy resin which said curing agent is adapted to cure at ambient temperature.

12. The combination of a building roof deck and a packaging arrangement for roofing elements for application to said roof deck in overlapping echelon which comprises covering elements for said overlapping echelon and limiting means on each of said elements for limiting the relative movement between adjacent elements whereby said elements may be moved from a packaged position to an overlapping echelon position with said limiting means automatically limiting the relative movement of adjacent elements and moving from said packaged position to said overlapping echelon position by an amount equal

to the predetermined overlap of said elements on said building, adhesive means being applied between said limiting means and said roof deck.

13. A method for laying shingle members on a sloping roof deck which comprises the steps of connecting the shingle members in their upper aspects with limiting means adapted to limit the relative movement of said shingles by a distance equal to a predetermined overlap of said shingles on said roof deck with said shingle members laterally staggered relative to each other so as to present laterally extending portions, assembling the array of shingle members so connected into a parallelepiped pack, preparing a further of said packs, interweaving the laterally extending portions of said packs, transporting said packs in their interwoven condition proximate to the ridge of said roof deck and attaching the leading shingle members of each said array thereto, opening said array downwardly while still in an interwoven condition on said roof deck from said leading shingle members whereby said shingle members lie on said roof deck in overlapping echelon, and securing said open array of said shingle members on said roof deck.

14. A method for laying shingle members on a sloping roof deck which comprises the steps of connecting the shingle members in their upper aspects with limiting means adapted to limit their relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck, assembling the array of shingle members so connected into a pack, transporting said pack to said roof deck, applying adhesive means to said roof deck for securing said array thereon, opening said array on said roof deck whereby said shingle members lie on said roof deck in overlapping echelon, and securing said opened array of said shingle members to said roof deck by said adhesive means.

15. A method for laying shingle members on a sloping roof deck which comprises the steps of connecting the shingle members in their upper aspects with limiting means adapted to limit the relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck, applying a first substance to the underside of said limiting means, assembling the array of shingle so connected into a pack, transporting said pack to said roof deck and applying to said roof deck a second substance adapted to react with said first substance to form a bond, opening said pack on said roof deck whereby said shingle members lie on said roof deck in overlapping echelon and said opened array of shingle members is secured to said roof deck by the bond formed by said substances.

16. A method for laying shingle members on a sloping roof deck which comprises the steps of connecting the shingle members in their upper aspects with limiting means adapted to limit the relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck, applying a first substance between said shingle members, assembling the array of shingle members so connected into a pack, transporting said pack to said roof deck and opening it thereon whereby said shingle members lie on said roof deck in overlapping echelon, applying a second substance adapted to react with said first substance to form a bond therewith between said shingle members, and securing said opened array of shingle members to said roof deck.

17. A method for laying shingle members on a sloping roof deck which comprises the steps of connecting the shingle members in their upper aspects with limiting means adapted to limit the relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck, applying a first substance to the underside of said shingle members, assembling the array of shingle members so connected into a pack, transporting said pack to said roof deck and applying to said roof deck a second substance adapted to react with said first substance to form a bond, opening said pack on said roof deck whereby said shingle members lie on said roof deck in overlapping echelon, said opened array of shingle members being secured to said roof deck by said bond formed between said first substance and said second substance.

18. A method for laying shingle members on a sloping roof deck which comprises the steps of connecting the shingle members in their upper aspects with limiting means adapted to limit the relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck, applying a first substance to the upper surface of said limiting means, assembling the array of shingle members so connected into a pack, transporting said pack to said roof deck and opening it thereon whereby said shingle members lie on said roof deck in overlapping echelon, applying a second substance adapted to react with said first substance to form a bond therewith to the undersides of said shingle members where they contact said limiting means, and securing said opened array of shingle members to said roof deck.

19. A method for laying shingle members on a sloping roof deck which comprises the steps of

connecting the shingle members (**15, 42, 51**) in their upper aspects directly to a foldable limiting means (**16, 41, 52**) adapted to limit the relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck,

assembling the array of shingle members so connected into a parallelepiped pack (**20, 40, 50**),

transporting said pack proximate to the ridge of said roof deck and attaching the leading shingle member (**15***a*) of said array thereto,

opening said array downwardly on said roof deck from said leading shingle member whereby said shingle members lie on said roof deck in overlapping echelon, and

securing said opened array of said shingle members to said roof deck.

20. A method in accordance with claim **19** wherein said shingle members are laterally staggered in said array and in said pack.

21. A method in accordance with claim **19** wherein said limiting means (**41**) comprise members which are foldable on a bias and are alternatively offset in their connections to said shingle members (**42**) whereby when said array is opened on said roof deck said shingle members are alternatively offset by the effect of said foldable members being pulled into alignment.

22. A method for laying shingle members on a sloping roof deck which comprises the steps of

connecting the shingle members (**15, 42, 51**) in their upper aspects directly to foldable limiting means (**16, 41, 52**) adapted to limit the relative movement of said shingle members by a distance equal to a predetermined overlap of said shingle members on said roof deck,

assembling the array of shingle members so connected into a pack (**20, 40, 50**),

transporting said pack to said roof deck and opening it thereon whereby said shingle members lie on said roof in overlapping echelon, and

securing said opened array of said shingle members to said roof deck.

23. A method of manufacturing an array of shingles for application to a roof or sides of a building in overlapping echelon which comprises the steps of:

forming pleats in a flexible foldable member (**16, 41**);

inserting shingles (**15, 42**) into each pleat in said foldable member so formed as to extend in part therefrom; and

securing each of said shingles to said foldable member.

24. A method in accordance with claim **23** wherein said

shingles are inserted into the pleats of said foldable member so as to be alternately staggered.

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ALFRED C. PERHAM, Primary Examiner

U.S. Cl. X.R.

52—309, 409, 420, 551, 748; 206—46, 65