

Feb. 11, 1941.

N. P. HARSHBERGER
SURFACE COVERING MATERIAL

2,231,006

Filed Oct. 11, 1937

4 Sheets-Sheet 1

Fig. 1

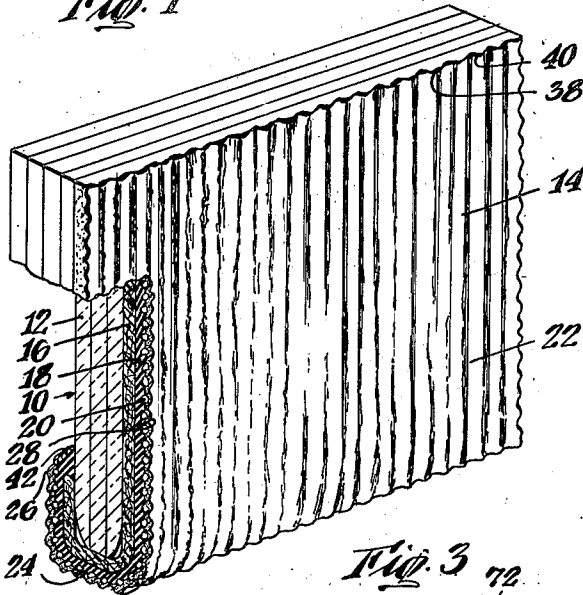


Fig. 2

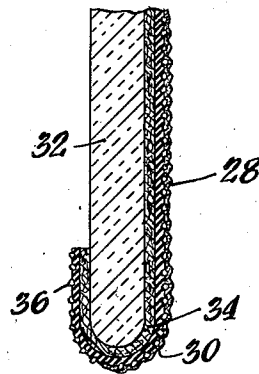


Fig. 3

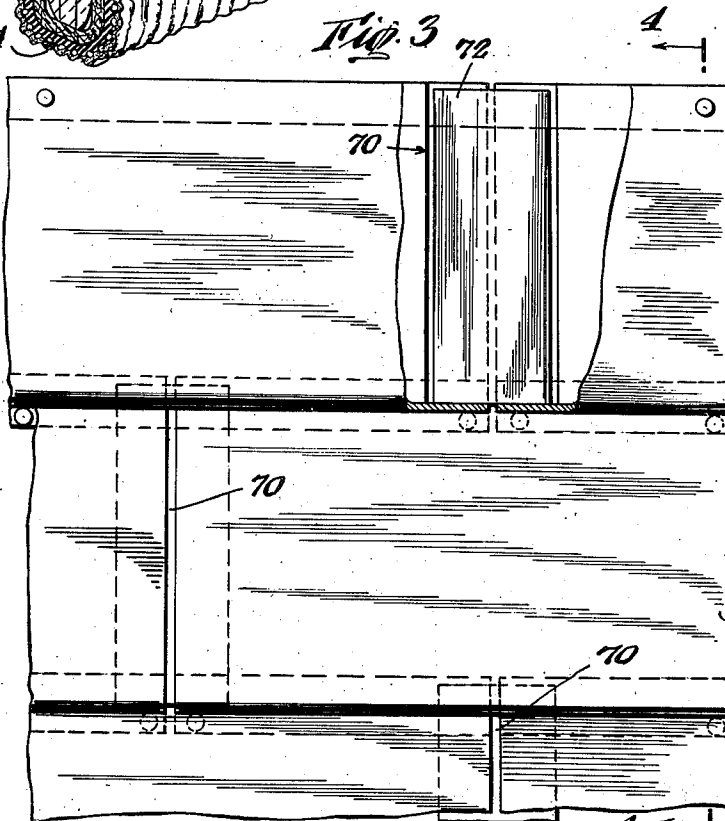
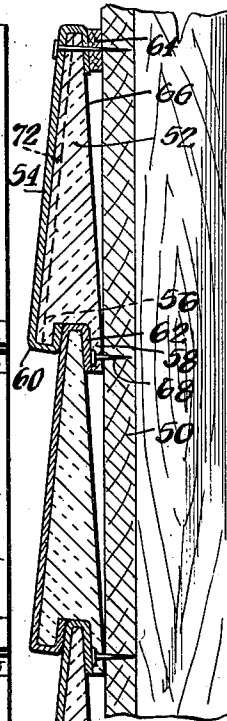


Fig. 4



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Fig. 5

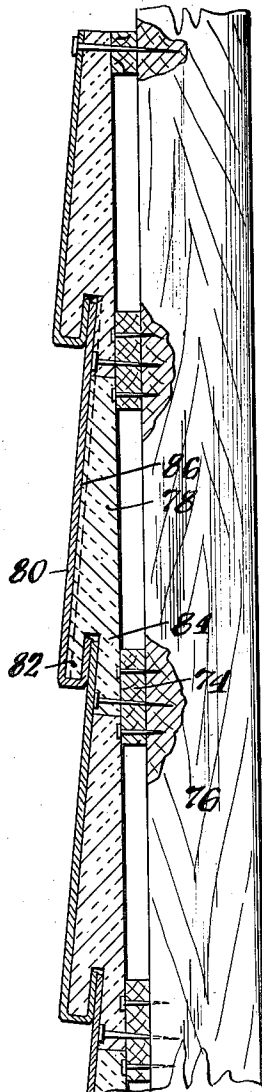


Fig. 6

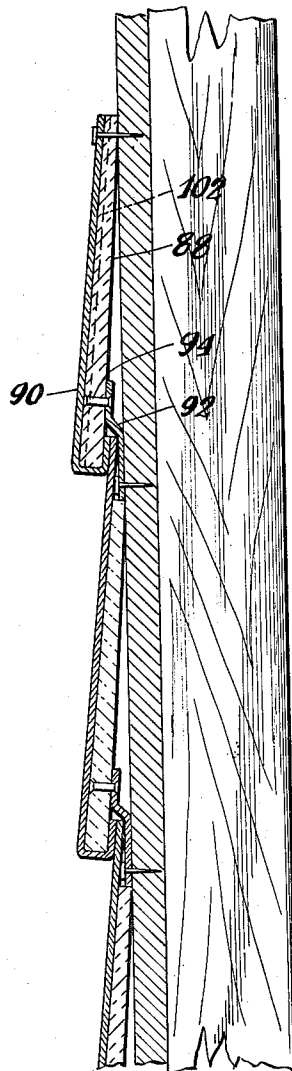
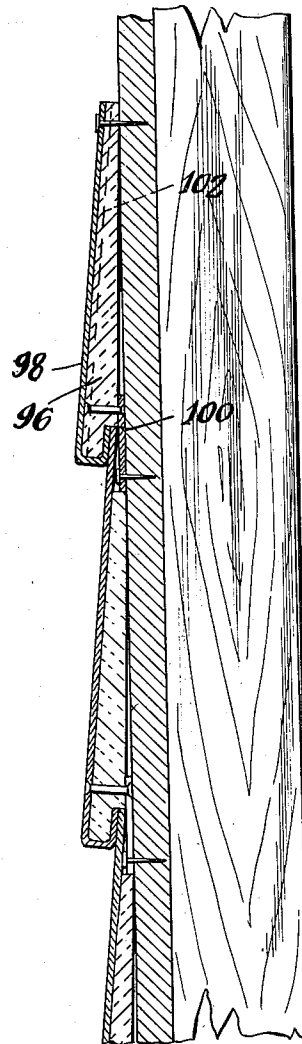


Fig. 7



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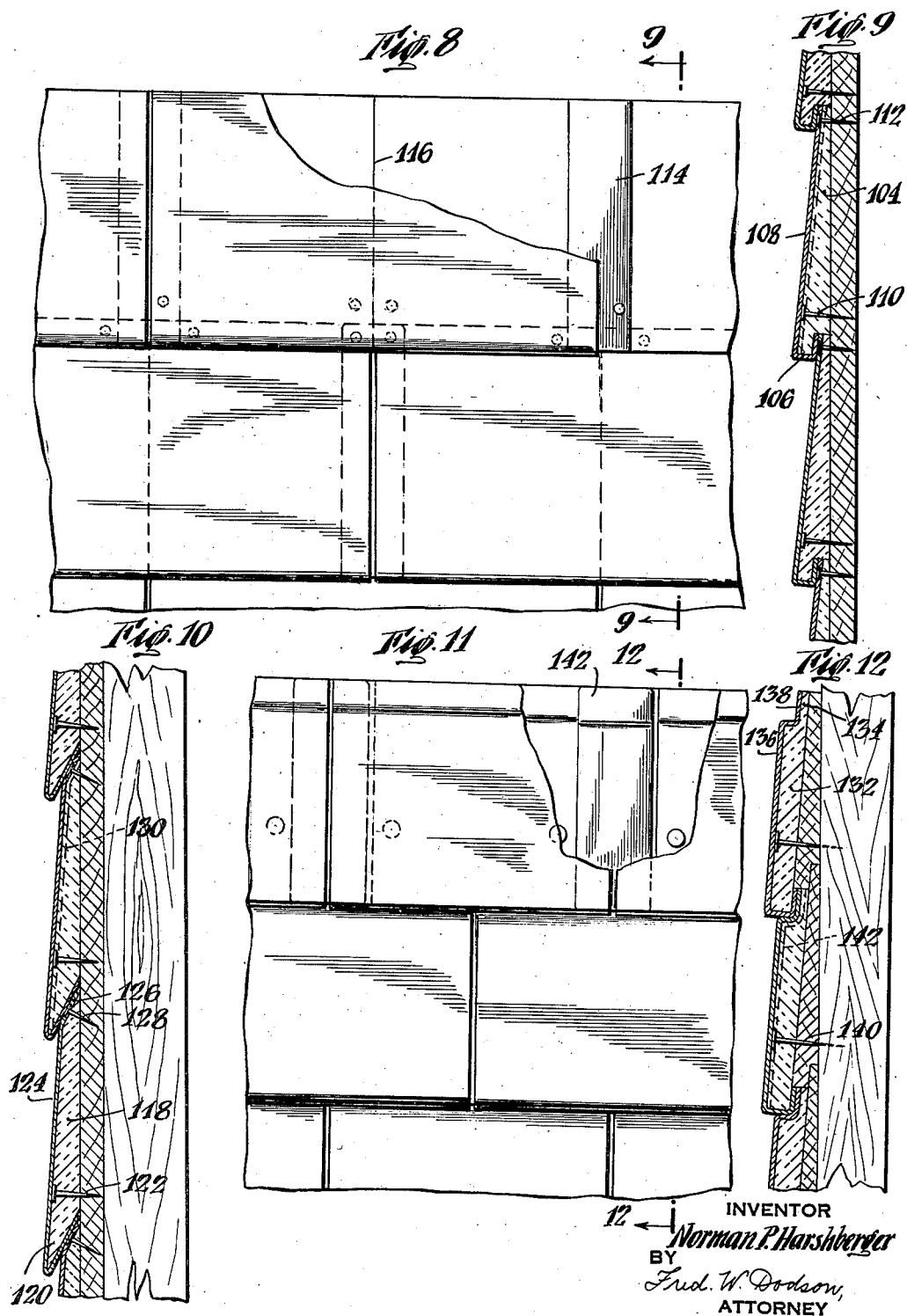
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Feb. 11, 1941.

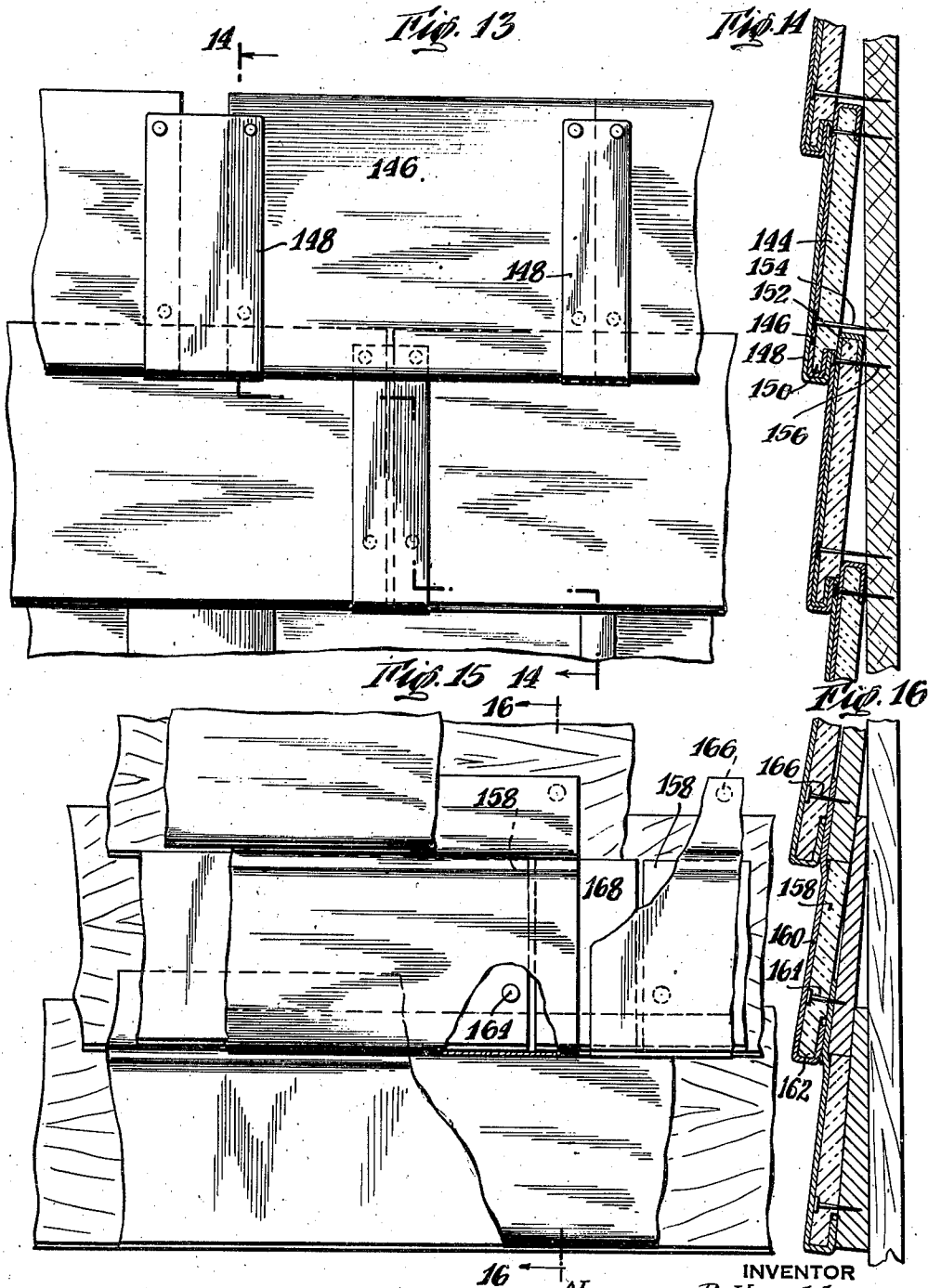
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SURFACE COVERING MATERIAL

Filed Oct. 11, 1937

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16

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UNITED STATES PATENT OFFICE

2,231,006

SURFACE COVERING MATERIAL

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Application October 11, 1937, Serial No. 168,389

19 Claims. (Cl. 20-5)

This invention relates to building materials, particularly shingles, strips, slabs, clapboards, insulating panels and the like, and to coverings thereof, both singularly and in combination, for walls, roofs, and other exposed building surfaces. Particularly, the invention relates to composite units and surface coverings thereof comprising a substantially stiff base, preferably of considerable thickness and possessed of good insulating properties, and an outer cover member of flexible composition roofing such as is generally used and well known to those skilled in the art. The invention further relates to a preformed covering element of flexible composition roofing for composite constructions and for surface coverings of the lap type, wherein butt edges of substantial thickness are exposed to produce ornamental and deep shadow effects, and which element has been treated as by a hydraulic cement composition. Moreover, the invention also relates to processes of fabricating the novel products of the invention and to methods of constructing surface coverings employing such products.

It is the principal object of my invention to overcome many drawbacks to the greater use of flush wallboard and lap siding employing, in whole or part, the usual composition roofing material which generally comprises a felted fibrous base treated with asphalt or other water resistant material, as by saturating or impregnating the base therewith, and coated upon the exposed surface and edges, and sometimes upon the rear surface, with an adhesive coating of asphalt or other water resistant materials. Such base material also generally has a layer of granular particles, for example, mineral particles of slate, tile, sand or the like, secured in the adhesive upon at least the exposed side for ornamentation and to provide protection for the bitumen adhesive.

It is well known that the asphalt coating ingredients of this material are subject to condensation or polymerization in exposure. This results in drying out, checking, and crumbling of the coating. It materially affects the bond of the surfacing granules and the material as a whole is subject to curling, and where bonded as a facing to other material, to delamination. The material is further susceptible to physical damage in handling, application, and in treading upon, because of its flabby character and softness of its constituents under warm climatic conditions, and must therefore be carefully handled.

Moreover, when combining this common material with a core or lath to obtain heavy butt effects, one method is for the applicator to fold or otherwise form the roofing sheet about the core or lath, after securing the latter to the support. It will be understood that this procedure, particularly in cool weather, induces fracture and breaking of the material at the bends. To avoid this difficulty, the covering may be made a permanent part of the core by an adhesive bond, as asphalt, but the material is then subjected to delamination and curling, warping and bulging in exposure. Moreover, the applicator must then stock completed units in many colors, which is a costly procedure. Preferably, the core piece is preformed and detachable but I have found that the usual composition roofing, because of its flexible body and thermoplastic ingredients, will not retain shaping and that folded and otherwise preformed portions lose their shaping before use. It would be a nuisance to the applicator to reshape the pieces in assembly, not considering the time and labor involved.

Thus, it will be evident that in addition to the natural disadvantages of the usual composition roofing, additional problems confront those who would use this material for its desirable properties in the making of wallboard and thick butt lap effects and, therefore, limit its use for these purposes.

Accordingly, it is the general object of the present invention to obtain a more satisfactory commercial product useful as a separate element of a composite product or as a permanent part thereof, by treating the composition roofing member to be exposed with a rigidifying coating to impart considerable stiffness to the material at all working temperatures, enabling its easy handling in substantial sizes and to provide shape retainment for any formed portion, to resist substantial deformation in storage and use, and to provide weather and fire protection for the bitumen and the structure of which the product is a part.

Another general object of my invention is the provision of materials and the formation of surface coverings simulating structural configurations, thick butt shingle effects, lap siding, and the like, and preferably simultaneously providing improved insulation.

A further object is the provision of a weather exposable product comprising a substantially stiff or rigid sheet-like layer of insulation material and a layer of covering material upon the portion to be exposed, improving the insulating

properties of the base layer and providing weather and fire protection for the composite unit.

An additional object of my invention is to provide a covering member useful as a shingle or cover piece for an additional base or core, which comprises a flexible base and a rigidifying coating of sufficient thickness, for instance, a phenolic resin, but preferably a hydraulic cement composition, applied thereto to impart stiffness to the base when hardened, to enable its satisfactory handling, particularly where of considerable size, and which base may include formed marginal portions made substantially shape-retaining by a similar coating.

Still another object of my invention is the provision of a composite unit comprising a base and a detachable cover piece having a formed marginal portion with bends of shape-retaining character and interlocking or interfitting with the base, and which base and cover piece are adapted to be laid as a single unit in the formation of a surface covering and when so laid possess individual freedom of expansion and contraction.

Another object is the provision of a bitumen treated fibrous wallboard layer and an ornamental facing comprising a hydraulic cement composition, whereby greater rigidity is obtained and warping in exposure is avoided, and whereby large sections may be readily handled and fastened to a supporting structure by a minimum of fasteners.

Still other objects and advantages of my invention with particular relation to the combination of materials and structure and the novel formation of surface coverings will more readily appear or be suggested to those skilled in the art by the following detailed description and from the accompanying drawings forming a part thereof, wherein certain embodiments of my invention are presented for a better understanding thereof although it will be understood that I do not desire to be limited to the specific embodiments herein-after disclosed.

Referring to the drawings wherein similar parts are denoted by similar identifying numerals:

Figure 1 is a perspective view partly in section of the principal components of a composite unit made in accordance with my invention.

Figure 2 is a cross sectional view of a modified butt portion construction of a composite unit made in accordance with my invention.

Figure 3 is a face view showing a section of a siding or other surface covered with composite units of my invention.

Figure 4 is a cross sectional view taken at 4—4 of Figure 3.

Figure 5 is a partial cross section taken through the joinder of a pair of courses of composite units showing a modified construction in accordance with my invention.

Figure 6 is a further modification of my invention showing the use of a projecting nailing means.

Figure 7 is a cross section of a modification of the structure in Figure 6.

Figure 8 is an assembly of a modified construction in accordance with my invention.

Figure 9 is a cross sectional view taken at 9—9 of Figure 8.

Figure 10 is a cross section of another modification of my invention.

Figure 11 is a face view of an assembly of a further modification.

Figure 12 is a cross sectional view taken at 12—12 of Figure 11.

Figure 13 is a face view of a further modified covering construction of my invention.

Figure 14 is a cross sectional view taken at 14—14 of Figure 13.

Figure 15 is a face view of an assembly showing the elements of my invention as used with a clap-board siding.

Figure 16 is a cross sectional view taken at 16—16 of Figure 15.

Figures 1 and 2 generally disclose forms of composite units embodying certain basic features of my invention. These units comprise a base or element 10 of stiff or rigid characteristics, to be covered, and preferably comprising a body of compressed or cemented vegetable and/or mineral fibrous material, for instance, bagasse, wood, substantially pure cellulose, paper, asbestos, mineral wool, animal hair, and others, usually used either alone or in combination, or adapted to be used in the making of products generally known to those skilled in the art as wallboard or insulating board. One form of commercial board of this character which I may use is marketed under the name "Celotex." The fibrous base may be of the same structure throughout or may, for the advantages obtained in certain constructions hereinafter to be described, comprise a plurality of separate sheet-like plies 12 bonded face to face by suitable cements to form an integral structure.

The fibrous material comprising the base may be rendered waterproof and/or fire-resistant by treatment with suitable agents such as silicates or bitumens, for instance, asphalt, tar or pitch, but preferably with a synthetic resin composition, for instance, comprising a phenol aldehyde resin or other known synthetic materials adapted to produce water insoluble and impervious films after evaporation of suitable solvents combined therewith. Such treatment may extend into one or more faces and edges of the base or throughout the base structure as by coating, saturating, or impregnating. Where the base is a laminated one, one or more plies only, preferably the outer ply may be treated, particularly where porosity, with its advantages of heat and sound insulation and lightness of mass, are desirable characteristics. The treatment may also be confined to certain sections of the base, particularly where said sections are to back up weather joints of further covering material. Furthermore, the base may be rendered water-resistant by incorporating a water emulsion of bitumen or synthetic resin with the fibrous material prior to forming the same into sheet form.

The base may be made into various forms and thicknesses but for the purpose of this invention it is preferred that the average thickness of the base be in the order of $\frac{1}{4}$ " to 1". It will, of course, be understood that lesser or greater thicknesses may be employed. The base may also be of the well known composition roofing previously described, and may be a plurality of layers of such material bonded together to form a layer of substantial thickness. Moreover, it may be found desirable to employ a base of a hydraulic cement fiber composition made into sheet form by low or high pressure. The material known as Transite is an example of a sheet made by high pressure, but such will be considerably heavier than the bases of equal section made by a low pressure process. Bases of other cementitious and fiber compositions are also contemplated, as well as bases of any of the aforesaid types where the in-

gredients comprising the same have been processed or treated with foams or gasifying substances to render them more porous and lighter in weight, and to improve their insulating characteristics. Further, bases of bitumen mastic employing scrap materials as fillers are also contemplated. It will also be understood that the base 10 may be further treated with any of the materials previously described to convey to the same an additional protective coating or surfacing.

The base covering, preferably a detached and loose member, is generally referred to by the numeral 14, and preferably comprises a water-resistant foundation layer and a surface layer comprising a rigidifying composition. In Figure 1, the covering 14 is shown to comprise a foundation layer of composition roofing, comprising a flexible felted fibrous layer 16 comprising any of the fibrous materials heretofore mentioned, preferably impregnated or saturated with a low melting point asphalt and coated with a further bituminous or resinous layer 18, also of any of the types heretofore mentioned. In the coating layer 18 is partially embedded and bonded a layer of individual granules 20, such as of slate, brick, tile or cement. Such composition roofing may be made in the manner disclosed in my prior Patent No. 1,913,667 granted June 13, 1933.

The covering 14 has a body portion 22 and a retroverted or underturned edge flange preferably extending the length of the butt edge. As shown in Figure 1, this flange comprises a substantially straight lip portion 24 connected by a bend to the body portion and a narrow lip 26 generally paralleling the body portion connected by a bend to the portion 24. It will be seen that the portion 24 covers the butt edge face of the base 10 to extend weather protection to the whole butt end of the base. Likewise, it will be noted that the base is slightly chamfered at the edge corners to compensate for any slight bulge of the covering material at the bends. It will also be observed that the shaped portion is made to substantially freely fit the base 10, i. e. the distance between the inner faces of the lip 26 and body portion 22 being substantially equal to the base 10 thickness at the position covered. Thus, the portions 24 and 26 create hook-like extensions to be interlocked or substantially fit the base and become anchored thereto without external fastening.

It has been found that because of the pliable and thermoplastic properties of the ordinary bitumen composition material aforesaid, it is difficult for this material, especially in warm weather, to retain in storage or otherwise the character of shaping here described. The lip 26 would readily distort, particularly where several inches or more in length. Likewise, the portion 24-26 would readily sag toward or away from the body 22, opening or closing the distance which it is desirable to substantially maintain in order to obtain proper fitting in assembly. In either case, if the covering were used during cool weather or when the bitumen was chilled, cracking at the bends might occur when forcing the hook into proper position. Moreover, some movement could also occur after assembly during warm weather, where the lip 26 was not nailed or otherwise fastened to the support, and to a lesser extent where the portion 22-24 was bonded in a well known manner to the base 10.

Accordingly, it is another feature of my invention to provide a formed cover element of

the character described with means to resist deformation and to obtain other desirable properties. To accomplish this end, I provide the outer side of the bends comprising the formed portion with a rigidifying layer 28. In the structure of Figure 1, bends occur at the junctions between portions 22 and 24, and 24 and 26 respectively. The coating preferably comprises an argillaceous material, preferably a hydraulic cement, of which Portland and oxychloride cements are examples, but I prefer a high early strength cement because of its advantages during processing of developing the strength of the shaped portion as rapidly as possible. An example of such a cement is that commercially obtainable under the name "Incor." Preferably still, I employ a high aluminat cement possessive of high early strength and properties of the character more fully described in my copending application Serial No. 738,875, filed August 7, 1934, for the many additional characteristics I obtain therefrom. It will be noted that the coating or layer 28 in the structure of Figure 1 is applied over the granular surfacing 26 and covers the exposed adhesive between the granules. I have found that a coating in the order of 20 lbs. per 100 square feet will provide considerable rigidity at the bend, generally sufficient to prevent any normal sagging or spreading of the open formed portion. By increasing the coating thickness, say to 40 lbs. or greater, the rigidity will measurably increase.

It will be understood that the coating or layer 28 may be of any color and may include any of the extending materials and be applied in the manner more particularly referred to in said copending application Serial No. 738,875, or in any other suitable way. As previously stated, when the coating is applied over the bends and becomes hardened, rigidity is imparted to the treated portion and any tendency of the portions forming the bends to normally or otherwise spread, is materially resisted. It will be appreciated that the cement layer 28 provides a section highly resistant to compression, in which condition it is substantially placed by reason of its position in the structure, when spreading tends to occur. Preferably, the layer 28 extends continuously over and between the bends of a formation such as shown in Figure 1, thus avoiding any bending or deformation between the bends there disclosed. Moreover, the layer extends preferably over the whole of the lip 26 to rigidify and stiffen the edge portion to avoid distortion and especially to provide a suitable leading edge that will not turn when engaging a base 10 in assembly. Furthermore, the layer 28 is made to additionally cover the body portion 22, at least the portion to be exposed, thereby imparting rigidity to the body portion 22 and making it easy to handle in assembly. It will be recognized that such rigidity is of considerable value when the element to be handled is of considerable size and the coating layer 28, it will be understood, overcomes the natural flabbiness of the base material.

Thus the cement layer 28 provides an advantageous function with respect to each portion of the cover piece covered by it and in combination with the base 16 provides a light weight cover piece capable of providing weather and fire resistance and capable of use as a detachable or permanently secured member with the base 10. Furthermore, in the stated structure the layer 28 shields in the bituminous coatings of the element and resists the deteriorating action here-

tofore encountered with the base material comprising the covering.

It will, of course, be understood that the described features are obtained with formed portions other than that shown in Figure 1. For example, the shaped portion may comprise a single bend as in the cover piece 30 of Figure 2, where the base 32 is fully rounded. Furthermore, the shaped portion may readily be a base as 22, having a single bent portion in the nature of the portion 24. It will also be understood that sag of the projecting portion is principally dependent upon the resistance of the bend at the junction with the main body portion, and in certain instances it may suffice to extend the layer 28, as shown in Figure 2, only over the outer bend 34. In such a construction the portion 36 will obviously retain its full pliable characteristics and will have the advantage of being adapted to be fitted to varying base thicknesses. The lip 36 may be made a minimum in thickness where space sufficient to accommodate a cement-treated leading edge is not provided. Also, the portion 36 may provide a two sided bituminous seal, such being secured where the portion 36 is faced with a skin coat of thermoplastic adhesive and the rear face of the covering 14 is similarly treated. These skin coats will adhere to the contacting surface under the action of absorbed heat in exposure.

Additional rigidity, particularly with light weight layers, may be obtained by creating upon the treated side of the base before or after shaping the portions 24 or 26, a plurality of ribs 38 separated by narrow and deep valleys 40. The ribs preferably will extend around the bend or bends, that is, at an angle to the line of bend, and such angle need not be a right angle. The ribs may be narrow and the valleys 40 preferably are narrow and may even be less than $\frac{1}{16}$ " in width, and will preferably be as deep as possible. In addition to providing rigidity, the rib-like surface will provide a pleasant architectural effect since it will be possible to simulate wood-grain effects and the like. However, it will be understood that the base and/or coating may be embossed or otherwise coated to produce ornamental visual effects in the way of designs or structural configurations. Moreover, the coating or layer 28 may have colored granules pressed therein to provide an artistic surfacing and to serve as a means of separation in curing.

Where the coating 28 extends over the leading edge of the shaped portion as, for example, at 42 on the cover piece of Figure 1, the edge is preferably made with a chamfer or tapered portion. This may be accomplished in any suitable manner, for example, by pressing the edge portion prior to the application of the layer 28.

It is also within the purview of my invention to make light weight cover pieces wherein the foundation layer 16 is one of a cement-fiber composition molded with shaped portions of the character of that of Figure 1, which are inherently stiff and do not require a further coating or layer of hydraulic cement to obtain rigidity.

Moreover, while I have disclosed the advantages of a hydraulic cement for the purposes of my invention, I have found that the desirable characteristics are obtainable, at least to some extent, by the use of certain synthetic resins of the type heretofore mentioned, which, when hardened, form a stiff film or layer. I, therefore, contemplate the use of such materials in certain cases as the coating 24. Also, such ma-

terials or even starches are contemplated as temporary stiffening agents during the shaping process prior to the application of the hydraulic cement facing 24. In such instances, it is preferred that the stiffening agent be applied to the rear face of the covering 14.

Where the cover piece 14 is to be provided with a cementitious or other rigidifying coating, such may be applied to the base material before or after a web of the same is formed into sections of suitable size. It will, of course, be understood that where bends or folds are formed upon the cover piece, such operations should be carried out prior to coating or before the coating material has hardened, in order that the rigidifying functions of the same shall be obtained in the formed structures.

In one mode of making the cover piece 14, it is preferred to provide individual sections of the cover piece material and to pass the same through a steam chamber, causing the material to be made limp and formable without cracking the component parts thereof, and to subsequently pass the same to a folding machine from which the material emerges with folds, for example, as that disclosed in Figures 1 and 2. Thereafter the formed pieces are treated with the rigidifying coating material to render the formed portions resistant to deformation. It is, however, also contemplated to bring the steam treated limp covering material 14 and sections of the base 10 together at the folding machine and to perform the folding operations employing the base 10 as a form. Thereafter, if the cover material has not previously been treated with the rigidifying coating, the cover pieces may be thus treated while still in combination with the base 10 or separately, if such base sections have been separated from the formed assembly. It will be further understood that while it is preferred that the cover pieces and base sections be maintained as separable units in view of their many advantages in assembly, the pieces may be integrally connected as by suitable stapling in portions not to be exposed in assembly or by an adhesive coating placed between the under face of the cover piece and the contacting face of the base 10. Adhesive may, if desired, be the base saturant or coating material and may be a bitumen such as asphalt or pitch, a synthetic resin adhesive such as a phenolic resin, and may be, in certain instances, a silicate binder, for example, sodium silicate or even a hydraulic cement, where the nature of the adjacent surfaces will permit proper anchorage thereof.

While the rigidifying coating, particularly a cementitious coating, may be applied in various ways known to the art, it is preferred that the procedure described in my copending application Serial No. 26,770, filed June 15, 1935, and that in the application of Thomas Brady, Serial No. 114,909, filed December 9, 1936, be followed. As described in these applications, the material to be coated is passed below impelling elements which carry a charge of the coating material and which impel said material against the material to be surfaced therewith. It will be evident that by proper arranging it is possible to use the indicated apparatus not only to coat sheets having their surface to be coated facing upwardly but also sheets or elements having formed portions such as shown in Figures 1 and 2, for example, of the drawings, and to coat the bends there disclosed either fully, which may require a second operation, or by a single operation sufficient-

ly to provide shape-retaining properties for the bend in the portion coated, in which case the coated portion will appear somewhat as shown in Figure 2.

Where the rigidifying coating is a hydraulic cement, the coated material will be cured in a manner more particularly described in my Patent No. 2,044,786, that is, the coated sections will be preferably stacked and cured in such operation. It has been found preferable to maintain the material in a curing room maintaining a temperature in the neighborhood of 95° F. and 95% relative humidity, in order to prevent loss of moisture from the coated edge portions of the pieces and to avoid dusting efflorescence. In certain instances, particularly where a bend of any size has been formed, it is contemplated to cure the cement coated cover member while combined with its base 2. In this manner, shaping of the cover piece is maintained during the critical curing stage and additional handling operations may be made unnecessary where the composite structure is desired for a surface covering. Where this type of curing operation is performed, it is preferred that the base 2 be one treated with a water-repellent material of any of the types heretofore mentioned to prevent infiltration of moisture and also, where necessary, to provide a desirable separating means between the compacted layers during curing.

The foregoing comprises the preferred basic combining elements of my invention. It will be appreciated that the individual elements may be modified at will, with particular regard to their shaping and design and the combining features be used in various ways. In the figures of the drawings to be described below, certain arrangements of the basic elements are set forth by way of example, each presenting certain features of construction desirable for specific applications. While I will not mention the same, it will be understood that the cover pieces and bases employed in these constructions may include any one or all of the features, with particular reference to construction and materials employed, of the preferred basic bases and cover pieces hereinabove described. It will likewise be understood that I do not limit myself to the same, as materials other than those specifically recited may be used where the characteristics of my invention are obtainable therefrom. Furthermore, it will be understood that certain features hereinafter to be described, may be employed without special regard to the materials of construction used, and while certain types of foundations are indicated in the various figures, the elements of the invention may be used over studdings, laths, boarding, clapboard sidings and old roofing, these being merely by way of example. Also the featured cover pieces may be used separately, as with previously applied shingle elements.

Referring to Figures 3 and 4, the latter figure discloses a partial cross section of a siding covering applied to a supporting boarding or sheeting surface 50, and which comprises courses of base elements 52, preferably of insulating board, laid as indicated in Figure 3, with the longitudinal ends thereof substantially in abutment and having cover pieces 54 assembled therewith. The base 52 is preferably of tapered cross section and generally of greater length than depth, the construction being such that units of considerable length may be made by reason of the stiffness provided. Moreover, the base has its greatest

thickness at the butt end and the butt edge face is recessed to receive the upper edge portion of a composite unit of a course below. This recess forms two lips or projections 56 and 58 respectively, the lip 56 projecting edgewise at the outer surface and 58 edgewise at the rear surface. It will be particularly noted that the rear lip is of greater depth than the face lip. This feature enables attachment of the base to the support with concealed nailing as the lip is of sufficient depth to receive nails or other securing means and is readily reachable in assembly without interference by or injury to the outer face or lip 56 of the base.

It will be seen that the cover piece has a hook portion 60 at the butt edge, which fits over the lip 56 and has an upper edge portion 62 folded over and about the upper or thin edge portion of the base. In this manner the cover piece is readily held to the base without other means of attachment and where the cover piece includes a cementitious or other rigidifying coating, it will be understood that the cover piece may be slid edgewise over the base. Such may be done at any time during or prior to application to the support. However, the character of the structure here disclosed permits permanent attachment of the cover piece to the base prior to assembly. This may be accomplished, for instance, by a suitable adhesive between the rear face of the cover piece and the front face of the base. It will be noted that the recess between the lips 56 and 58 is somewhat tapered inwardly and thereby readily receives the upper edge portion of a unit comprising two thicknesses of cover material and the base portion. It will be understood that where the cover piece is a permanent part of the base, the folded over portion 62 may be omitted, as it will be seen that the upper edge portion of the outer face of the cover piece will be held by the outermost face of the recess.

The elements are assembled commencing with the uppermost course of units, a row of nails being secured through the upper edge portion of the first course of units and a filler piece 64 being provided to create in the first course, as well as in the subsequent courses, dead air spaces 66 for improved insulation. Obviously, these exposed nails will be protected by the eaves of the structure. In addition thereto, nails 68 will be secured through the projecting lips 58 of each unit. Subsequently, the next course of units will be positioned, the upper edge portion of each unit being fitted into the recess in the lower edge of the adjacent course and nails will be secured through the lips 58 of these elements as before. Obviously, in this course and succeeding courses, no upper edge nailing will be required. It will also be noted that by this manner of assembly, the tapered effect of the units permit a slight wedging in the recesses of other units to obtain tight joints, and that the upper edge portion of each unit conceals the nailing of the previous course of units. Also, a pleasing clapboard effect is obtainable.

With further reference to Figure 3, it will be noted that the bases and cover pieces may be the full length of the course or may have any length desired. Thus, the length of the composite elements may be 1' or 4', depending upon the size of unit it is found most desirable to handle. Where joints are created as at 70, some provision must be made to prevent seepage of water to the support and to the base material, particularly where it has not been treated to

make it weather-resistant. To accomplish this, joint or batten pieces 72, generally pieces of fabric, such as felt, treated with a water-resistant compound, such as asphalt or synthetic resin, are provided to be used in conjunction with the cover pieces to form end laps of weathertight characteristics. It is preferred for reasons of handling and fitting, that these pieces be relatively stiff. To provide for the joint piece 72, the outer face of the base 52 is preferably recessed to receive this layer. This is done in order to avoid producing any bulge of the cover pieces at the joint between adjacent sections thereof. The pieces 72 will be of sufficient thickness to provide long life and will have sufficient width to prevent leakage of water due to side drive of rain at the joints. Where the cover pieces are a permanent part of the base, the ends of the bases should be recessed so that about half of the joint piece 72 laps each end of the adjacent bases at a joint. However, where the cover pieces are disconnected with respect to the base, it will be seen that it makes little difference where the joint piece is positioned, that is, the base may be recessed at a point spaced from its end providing that the cover pieces fit over the joint between adjacent base sections. The joint or batten piece 72 is preferably a loose piece, but it will be understood that the same may be cemented to the base or cover piece where desired.

In Figure 5, I have shown an arrangement of composite units having particular suitability for attachment to flush boarding or studs. In the drawings a studding construction is shown, the units being mounted against spaced horizontal boards 74, which are first secured to the uprights or studs 76. The composite units each comprise a base 78 of tapered section and a cover piece 80, the lower edge of which is retroverted to form a hook. It will be noted that the butt edge portion of the base 78 is recessed to form, as in the bases of Figure 4, a pair of projections or lips 82 and 84 respectively, the rear lip 84 being lower than the front one 82, so that it may be, as previously explained, used as a nailing means. The recess, in this instance, is narrower than that of the bases in Figure 4, as it need only receive the two thicknesses of cover piece material. Thus, it will be appreciated that the bases in this construction may be much thinner in section than those of Figure 4. A further feature of the arrangement consists in the abutment of the adjacent horizontal edges of bases of adjacent courses. Thus, the lower edge face of the lip 84 acts as a registration for the next lower base 78. In this manner the position of the horizontal joints may be predetermined and the boards 74 may be positioned and nailed to the studs 76 so as to back up the horizontal joints between courses of units and provide a backing against which to nail the lips 84. The face of the cover piece 80 is of greater depth than the base 78, and when assembled it projects above the upper edge thereof and may be slid into the edge recess of the bases of the next higher course. Thus, the horizontal joints between the bases of said adjacent courses will be protected from the weather. It is further preferred that the projecting portion be treated in the manner heretofore described for the hook portion to give it sufficient rigidity to enable ready assembly into the recess of the adjacent base.

Unless the cover pieces are cemented in position as they are mounted, it is further preferred

that they be factory fabricated as a part of the base to prevent their displacement. The vertical joints between cover pieces may be protected by joint or batten pieces 86, indicated by the dotted line in Figure 5, in the manner described with respect to the units of Figures 3 and 4. The courses of bases will also be assembled, working downwardly from the top of the surface to be covered, and it will be noted that the lip nailing is the only fastening that is required, the rigidity of the cover piece facing following treatment being sufficient, together with this nailing, to prevent displacement of the bases.

In Figure 6, a construction of composite units is provided comprising bases 88 and cover pieces 90, wherein the lower end of the base requires no recessing. As with the cover pieces of Figure 5, each such element is provided with a hook-like lower edge portion and the upper portion of the cover piece extends beyond the upper edge of the base 88. In this construction, the hook portion of the cover piece is of sufficient size to receive the whole butt edge portion of the base. Unless the cover pieces be cemented to the bases during application, it is preferred that they be a permanent part of the base and made so during factory fabrication as by a suitable cement. The composite units are secured to a wall or the like by formed pieces 92 attached to a butt edge portion of the base pieces. These may be the entire length of the base pieces or may be narrow sections of finger-like construction spaced apart over the length of the base. Obviously, in the latter instance, the number used will be determined by the length of the unit. However, at least two should be provided. It will be observed that the strip 92 is formed as to have substantially three sections, one secured to the base, a second at an angle to the first and projecting away from the rear face of the base, and a third in a plane substantially paralleling the first and projecting below the butt edge of the base so as to provide an exposed and accessible nailing tab, through which to secure a nail or other fastener to mount the units in position. The pieces 92 may be made of metal, for instance, sheet metal, or may be of any composition material, for instance, a strong fabric strip treated as by a saturant or coating, for instance, a synthetic resin, to render them shape-retaining. The strip 92 may be wholly rigid, but preferably has some flexibility.

The purpose of the middle section of this strip 92 is to space the base away from the mounting surface a sufficient amount to permit the projecting portion of the cover piece of a next lower course to be inserted behind the butt of the overlying units, and simultaneously cover and protect the said nailing strip and its fasteners. Where the nailing strip is of sufficient thickness, it may be made of such depth in the projecting portion as to provide by its lowermost edge, a point of registration for positioning the next lower course of bases, that is, it may act as a stop for the upper edge of the bases of the next lower course. The nailing strip 92 may be secured to the base by rivets or other fastening means 94, which extend through or only partially into the base 88. It will be understood that the nailing strip feature here described may be employed with other siding units where no cover piece is employed, for example, where the siding unit is a sheet of fiber cement or the like. In such instances, it will be preferred that the fastening means for the nailing strip be embedded in the composition

material and concealed therein, or that if the nailing strip be a narrow member the first section thereof be embedded in said material before it has set or hardened. The units here described will be assembled in courses starting from the top and working downwardly, unless the cover pieces be secured at the time of application, in which case the bases may be mounted commencing from the top or bottom of the surface. It will also be noted that in the construction of Figure 6, dead air spaces are provided at the back of each unit.

In Figure 7, a construction of composite units similar to that of Figure 6 is shown, with the distinction that the elements are assembled so as to lie close to the wall surface to which they are secured. The base piece there shown, denoted by the numeral 96, has its butt edge portion notched out to receive the retroverted portion of the cover piece 98 there shown. Moreover, the notching is of sufficient depth as to also receive the upper edge portion of the cover piece of the next lower course of units. In addition, the nailing strip 100 is a flat member and will, therefore, be more readily packaged for shipment.

It will be understood that in the constructions of Figures 6 and 7, that batten or joint strips 102, as indicated by the dotted lines in said figures, may be provided to protect the joints between cover pieces in the same course. These strips should project above the upper edge of the base pieces as far as the cover strips.

In Figures 8, 9 and 10, forms of sliding construction are illustrated, wherein the cover pieces of the composite units are intended to be separable from the insulating base pieces and separately mounted. The arrangements are particularly adapted for flush mounting and to produce the effect of a clapboard siding.

In Figure 9, the butt edge of the base piece 104 is formed with a notch producing a lip 106, which overlaps the composite units of a course below. The cover piece 108, which is treated to provide the novel features described with respect to the basic cover piece 14 of Figure 1, has a hooked edge portion to fit the lip 106, and is substantially the depth of the base 104. In applying the units, the base pieces of a course are secured to the supporting surface by fasteners such as nails 110 secured through the butt portion of the bases 104. Next, the cover pieces 108 are hooked over the lip portions of the base pieces and pushed upwardly as far as they will go, the lower edge of the lip 106 acting as a stop. Nails or other fasteners 112 are then secured through the cover piece and base piece adjacent the upper edge of the composite structure in a position where they will be covered by the projecting lip of the next overlying course of units. When one course of units have been laid, the next overlying course of bases are positioned with the lip portions 106 thereof overlying the cover fastening means of the next lower course and with the upper end of the notch at the butt of the base pieces abutting the upper edge of the base pieces of the said subjacent course, thus producing a continuous covering of the base elements. These base pieces will then be secured to the support and cover pieces applied in the same manner described with respect to the initial course of units.

As heretofore indicated, the vertical joints between cover pieces are protected by suitable weather-resistant batten or joint pieces, which are suitably set in recesses provided in the face of the base elements. Also, as previously indi-

cated, where the cover pieces are detached it makes little difference where these batten strips are positioned, and in the instant Figure 8, the batten piece 114 is shown as positioned a considerable distance from the end edge 116 of a base piece 104. The cover pieces in this figure are shown to completely protect the joint between base pieces and to break joints with the adjacent cover pieces immediately above the battens 114. Obviously, as previously indicated, the batten or joint pieces, in this instance 114, may be cemented or secured as by nails to the base piece either prior to or during application. It will be seen from Figure 8 that the upper and lower edges of the batten pieces 114 are substantially flush with the upper and lower edges respectively of the outer face of the base piece 104.

In the units of Figure 10, the base piece 118 is of somewhat different shape than that of Figure 9, the base 118 having an outward tapered face, as well as a tapered butt edge portion 120 which provides an overhanging water drip. In this arrangement the bases 118 are secured as by nails 122 near their butts to the supporting surface and the cover pieces 124 are slid into position, the cover piece being provided with a lower hook portion to fit the portion 120 of the base 118. It will be noted that the upper edge face of the base is substantially parallel to that at its lower end and that the cover piece 124 has a formed portion 126, which nests against this upper face. As shown, fastening means such as nails 128 are secured through the portion 126 of the cover piece and through the base 118 at its thin end to secure the cover piece in position and to further aid in holding the base 118 against its supporting surface. Subsequently, the next course of composite units are laid with the hook portion of the cover piece bearing against the portion 126 of the cover piece of the subjacent course. It will be understood that in positioning the base pieces 118 of the subsequent courses, a temporary space piece should be preferably employed in mounting the base pieces to provide for the thickness of the hook portion of the cover piece, or alternatively the base and cover piece may be mounted as a unit and the cover piece slid along to expose the nailing positions for the base. Obviously, joint or batten pieces 130 may be provided as described with respect to the previous figures.

In Figures 11 and 12, a novel arrangement is provided adaptable for application over a clapboard siding and wherein it is desired to reproduce a clapboard effect with the composite units of my invention. The base pieces 132, in this modification, have substantially parallel faces and substantially square lower edge faces. The upper edge portion of the bases 132 have outer notches forming lips or projections 134, the depth of which is determined by the amount of lap to be obtained between adjacent courses of composite units. The cover pieces 136 have a hooked lower portion which fits over the butt portion of the base pieces and the upper edge portions of the cover pieces are formed with reverse L portions 138, which nest with the upper edge notches of the base pieces 132. The thickness of the base lip portion 134 is determined by the amount of step-back of the original clapboard siding and is made such that its thickness, plus the thickness of two layers of cover piece material, is substantially equal to said step-back.

In application, the base pieces are positioned against a clapboard face in substantial end to

end abutment and with their upper edges abutting the outwardly extending butt of the next higher clapboard and secured as by nails 140 at a lower portion, in place. The cover piece or pieces are then slid into position. Subsequently, the next lower or higher courses of base pieces are secured in place and their cover pieces likewise slid into position. It will be noted that the composite units here illustrated are of such depth that the butt of one unit projects below the clapboard against which it is secured, and laps the upper or thinned portion of units in the subjacent course, thereby holding the cover pieces of the subjacent units in position and avoiding any nailing or other fastening thereof. Batten or joint strips 142 may be provided to protect the joints between adjacent cover pieces and these may be of the character and located as heretofore described with respect to previous arrangements. In the present construction, it will be noted, however, that the batten piece 142 sets in a recess at the end of each base section and, furthermore, the batten piece is so shaped as to follow the recess at the upper edge portion of the base pieces so as to extend weather protection to the lap portion between courses.

In Figures 13 and 14, an arrangement is shown of insulating members with cover pieces, which may be laid in courses wide spaced or butting, with additional cover pieces providing weather protection between adjacent ends of units in the same course. The additional cover pieces may be of the same width or of random width and their width will determine the amount of wide spacing between any two adjacent composite units. In this manner, many novel surface effects may be obtained and it will be appreciated that batten or joint strips of the character described with respect to the previous figures are made unnecessary according to the construction here disclosed. Thus, each course in the arrangement of Figure 13 comprises base pieces 144, base cover pieces 146 and joint cover pieces 148. The lower edge portion of the base piece 144 is notched at its rear face to form a lip or projection 150 and the cover piece 146 is formed with a retroverted hook-like portion which fits the lip 150. The upper edge portion of the base 144 may also be provided with a rear recess forming a lip 152, over which may be fitted a retroverted hook-like portion at the upper edge of the cover piece 146. This hook and recess may, however, where desired, be omitted. The cover piece 146 may be made a permanent part of the base 144 but preferably is a loose piece. Obviously, by means of the two indicated hooks, it may be assembled with the bases before application and held thereto without additional securing means. Even if the upper hook be omitted, the assembly may be conducted without presecurement of the cover piece 146 to the base 144. However, it is preferred, in such instance, that the cover piece be tacked to the base by cement or other suitable means. This may be done before or during application and merely assures the proper positioning of the joint cover piece 148. In assembly, the rear face of the base 144 will be positioned against the outer face of the cover piece 146 of units in the next lower course, thereby overlapping said lower course of units.

The depth of the joint cover piece 148 in said lower course will be made such that its upper end acts as a stop for the recessed portion of the overlying base 144 and thereby controls the

extent of the overlap. In order that the rear face of the base 144 may be positioned as described, it is preferred that the depth of the recess normal to the rear face of the base be at least equal to the summation of the thicknesses of the base and joint cover piece under turned portions and the thickness of the joint cover piece in the next lower course at its upper end where it underlies the said base 144. By providing the recessing described, a fastening means such as a nail 154 may be secured through the base 144 immediately adjacent the upper edge portion of the composite unit which it overlaps. Next, the cover piece 146 will be positioned and preferably tacked in place, as previously described. Thereafter, when the adjacent base and cover piece have been secured in place, the joint cover member will be hooked into position over the base cover pieces and fastened as by nails 156 at the upper edge of the units. These nails 156 will pass through a joint cover piece, the base cover piece and base, into the support. The base and joint cover pieces will preferably be of similar material and may be similarly or differently ornamented, as desired. Obviously, when the next course of units are laid, the fasteners 156 will be lapped and thereby protected. It will be noted that dead air spaces are provided in each course at the rear of each course of units, and in this manner additional insulation protection is obtained. Moreover, it should be understood that the combination of double cover pieces and wide spacing effect here disclosed in Figure 13 in connection with bases 144, may similarly be carried out without the base element 144 and a continuous weather covering thereby produced. In such cases, the pieces 146 may have their hook portion omitted or retroverted against the face of this member where desired.

In Figures 15 and 16, I have shown a further arrangement of composite units of my invention with respect to a clapboard or wood shingle siding application. In this arrangement, I provide bases 158 and cover pieces 160, which may be of uniform thickness throughout. The base pieces are preferably rectangular in section but may be tapered if desired. In any case, the thickness of the upper edge portion of the base 158 should not exceed the step-up between adjacent clapboards and where the bases are made tapered, the amount of tapering should not be such as to prevent proper placement of the cover pieces 160, as will hereinafter be understood.

The lower edge portions of the bases 158 are preferably recessed upon the rear face to form a lip 162, the depth of the recess being preferably at least the thickness of the cover piece material. It will be observed from Figure 16 that the base 158 is made preferably of a depth substantially that of the clapboard or wood shingle facing. The cover pieces 160 are formed at their lower edge portion with a turned-under hook which fits the lip 162 of the base 158. The face of the cover piece is made of greater depth than the base 158 so that it may extend beneath the next overlying base in assembly and be secured in place. In assembly, the base pieces 158 will be positioned and fastened as by nails 164 near the lower butt portion, said nails also, where desired, passing through the upper end of the cover piece 160 of the adjacent lower course of units. Thereafter, the cover pieces 160 will be hooked in place and their upper ends fastened against the next higher clapboard or shingle facing as by nails 166. In order to provide weather pro-

tection at the joints between cover pieces in any course, I may employ joint pieces or batten strips as have heretofore been described, and which will be the depth of the base pieces 158. However, 5 in the present construction I prefer, in order to simplify assembly and avoid the handling of thin batten strips, to back up the joint with a separate piece 168 of similar section to the base pieces 158 and of similar or other material which 10 has been suitably treated as by coating or impregnation with a water-resistant compound, for instance, a bitumen or synthetic resin. The pieces 168 will be of sufficient width to provide a proper weather-lap, and in assembly will be 15 placed in position as any other base piece 158 with its ends substantially abutting the adjacent end of the base pieces 158. A joint piece 168 may be fastened as by nails to the support in the covered portion or may be left a loose piece to be slipped in when assembling the cover pieces 20 168.

From a consideration of the foregoing description of my invention, it will be seen that I have produced novel surface covering products and 25 siding constructions thereof. Also, I have shown many novel methods of assembly. I desire it to be understood that while certain figures of the drawings indicate the use of joint or batten strips to protect the joints between adjacent cover pieces in a course, these may be omitted where 30 the base has itself been treated to be weather-resistant, at least in the portion surrounding the joint between adjacent cover pieces. It will further be understood that many changes in the foregoing exemplified constructions will suggest 35 themselves to those skilled in the art without departing from the scope and spirit of my invention. Accordingly, I desire my invention to be constructed as including all equivalents and as 40 broadly as the claims, when taken in conjunction with the prior art, may allow.

I claim:

1. A surface covering element comprising a pliable foundation layer, said layer having an edge 45 portion bent to present an angular lip to engage the edge of a companion piece when assembled, and said layer and lip having a hardened and non-softening coating rigidifying the bend thereof whereby to resist relative displacement of said 50 portions, the surface of said foundation layer where said coating is applied being of roughened character to anchor said coating.

2. In a building structure, the combination 55 comprising a stiff heat and cold insulating base and a weather cover piece therefor, comprising a weather-resistant non-metallic body portion and a preformed hook-like lip at an edge thereof engaging an edge of said base, said hook-like lip 60 having a hardened and non-softening coating rigidifying the bend of said hook.

3. The combination comprising a heat and cold insulating base having a pair of marginal lips at one edge and a weather-resistant cover piece 65 for said base, having a bent marginal portion interfitted with one of said base lips, the second lip constituting an exposed fastening projection for the composite structure and said cover piece having its opposite marginal portion extending 70 over the edge of said base opposite said lips whereby to lie between the lips of an adjacent similar base in assembly and overlies the second lip of said base.

4. The combination comprising a heat and cold insulating base and a weather-resistant cover 75 piece therefor, said base having a front and a

rear lip and a recess at its butt edge and said cover piece having a bent marginal portion interfitted with said front lip and having its opposite edge portion projecting beyond the opposite edge of said base whereby to interlock in the recess of an adjacent base in assembly, said rear lip projecting beyond said front lip to provide an exposed nailing means for said base and being covered in assembly by the projecting cover piece 10 of an interlocking base.

5. A siding covering comprising a support and overlapping courses of composite units each comprising a heat and cold insulating base and a weather-resistant cover piece, therefor, said base 15 having a projecting lip at its butt edge and said cover piece having a bent butt edge portion, each base being secured to said support by fastening means adjacent its butt edge and each cover piece having its bent portion abutting the said lip of a base in the same course and being secured by additional fastening means adjacent its 20 upper edge, said first named fastening means being covered by said cover piece and said second named fastening means being covered by the overlapping lip of a composite unit in the adjacent overlapping course.

6. The combination comprising a heat and cold insulating base and a cover piece therefor, said base having a marginal depression at an edge 30 thereof, and said cover piece having a bent portion interfitted with said depression and another bent portion interfitted with the opposite edge of said base.

7. A weather siding comprising a clapboard surfacing and courses of composite units as 35 claimed in claim 6 secured thereto, the composite units in each course being secured in place with their upper base edges abutting the butt edge face of a clapboard and with their depressed cover portions overlapped by the butt portion of 40 composite units of an adjacent higher course of units.

8. A weather covering comprising a support and overlapping courses each comprising a plurality of combined members comprising bases 45 and cover pieces therefor having bent butt portions, said bases being secured to said support and said cover pieces covering said bases and having their bent butt portions engaged with the butt edges of said bases, and there being additional cover pieces in each course also having a 50 bent butt portion, said latter cover pieces overlying the joint between the adjacent first named cover pieces of the same course and having their bent butt portions engaged with the bent butt 55 portions of said first named underlying cover pieces in the same course.

9. A weather covering as claimed in claim 8, wherein the bases comprise stiff heat and cold insulating members of greater thickness than 60 the cover pieces.

10. A weather covering as claimed in claim 8, wherein the first named cover pieces are wide spaced in the courses and wherein the joint cover 65 pieces are of sufficient width to provide a weather side lap.

11. A weather covering as claimed in claim 8, wherein a random effect is obtained by cover pieces of random width.

12. A siding structure comprising a support including overlapping courses of clapboards and a weather and insulation covering therefor, comprising courses of composite units, said units 70 comprising heat and cold insulating bases and weather-resistant cover pieces of greater face 75

depth than the bases and having bent butt portions, the bases in each course arranged with their upper edge faces substantially abutting the butt edge face of a clapboard and with the end edge faces of adjacent bases adjoining each other, and the cover pieces having their bent portions engaged with the butt edges of the bases in the same course and overlapping the next higher clapboard against which their bases abut and said cover pieces underlying the bases of the next course of units; the adjacent courses of units overlapping each other and there being weather-resistant material backing up the joints between adjacent cover pieces of the same course.

13. A siding structure as claimed in claim 12, wherein the joints between adjacent cover pieces are backed up by weather-resistant inserts of similar vertical sections to the bases and of sufficient width to protect said joints against the weather.

14. A siding unit comprising a substantially stiff weather-resistant base having a butt portion to lap an adjacent unit in assembly and produce a clapboard lap effect and having a flexible strip providing an exposed fastening extension to be covered in assembly, projecting beyond said lap portion whereby to secure said unit to the support, a part of said extension being spaced from said lap portion to form a locking groove to receive the underlying portion of the adjacent unit.

15. A siding assembly comprising a support and courses of units, each comprising a substantially stiff base having a butt portion to lap an adjacent unit and having a flexible strip providing a fastening extension exposed during mounting, which projects beyond said lap portion and part of which is spaced from said lap portion to form a locking groove, each unit being secured to the support by nails driven through said fastening extension and said locking groove being engaged with the end of an adjacent unit.

16. A roofing and siding element comprising a pliable foundation layer having a retroverted

marginal portion forming an upwardly directed hook to interlock with an underlying member when assembled, and a hardened and rigidifying coating comprising hydraulic cement extending over the portion of said element to be exposed and around the bend of said retroverted portion whereby to rigidify said foundation layer to make it more readily handled and whereby to rigidify said retroverted portion to resist relative displacement in assembly.

17. A weather siding comprising a support, longitudinal courses of insulating bases and cover pieces therefor secured to said support, said bases being positioned substantially end to end and the cover pieces overlying the top faces of and having bent portions engaged with the butts of the bases in the same course, said cover pieces breaking joint between the opposite ends of an underlying base and there being a layer of weather-resistant material on said base and straddling said joints and substantially flush with the top faces of said bases, said layer extending transversely from the butt edges of the bases to a position underlying the corresponding butt edges of similar bases in the adjacent higher course.

18. A roofing and siding element as claimed in claim 16, wherein the leading edge of the retroverted portion is tapered.

19. A roofing and siding element comprising a bitumen treated fibrous foundation layer having a portion retroverted to form an open fold between which to receive a companion piece when assembled; said layer having interspersed impervious material bonded to said bitumen and there being hardened and non-softening rigidifying coating material of sufficient thickness extending over said foundation layer and around the bend of said fold whereby to rigidify said foundation layer to make it more readily handled and to rigidify the fold to resist relative displacement of the portions thereof in assembly.

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