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METAL CLIP

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This invention relates to the laying of a composite roof structure, flooring, and the like; and in particular, this invention relates to an improvement in metal clips for securing in juxtaposition the units comprising the composite roof structure, flooring, and the like.

Prior to this invention composite roof structure, flooring, and tiling have been laid in a mastic or other plastic material by mopping or otherwise applying the mastic to a supporting structure such as a roof structure, flooring construction, or walls. When the mastic has been applied in this manner, the structural units for a composite roof structure or the like are usually not level, that is when they are placed in juxtaposition, the various corners of each structural unit are at different elevations from the adjacent structural unit. Although the edges of the various units after they are applied to the mastic have their edges stepped down or even weighted, it has been found that the edges and corners of the various units making up the composite roof structure are not uniformly laid. Particularly, this is so as the units are preferably laid $\frac{1}{4}$ " apart in order that a suitable mastic can be laid in the space between the edges of the unit.

It is a particular object of this invention to provide a novel method and clips for applying the unit for these composite roof structures, or the like, so that in the resultant surface formed of a plurality of the units, the individual units will all be substantially in a plane and uniformly spaced from each other for suitable application of mastic between the units.

An object of this invention is the provision of a clip serving to support adjacent edges of tile form units whereby adjacent top surfaces of adjacent units will be aligned in a plane surface.

A particular object of the invention is to provide a novel metal clip construction so that the metal clip not only supports adjacent units, but also serves to space the units from each other a predetermined amount; and, in this particular embodiment of my invention, this distance is preferably substantially $\frac{1}{4}$ " spacing. The metal clip is also adapted to affix itself to the unit which it is supporting and gauging with respect to another unit.

Another object of my invention is to provide a novel metal clip which is adapted to support the adjacent corners of abutting units, and also to provide another type of metal clip formed in a similar manner for supporting the units at their corners when laid in offset formation.

Further objects and advantages will become

apparent from the following detailed description of the preferred embodiment of the invention as illustrated in the accompanying drawing, where:

Figure 1 is a plan view illustrating a composite insulated roof structure laid according to my invention using my novel metal clips;

Figure 2 is an enlarged perspective of my novel metal clip for securing the units as illustrated in Figure 1, and illustrating how it may be used for spacing the adjacent units of a composite structure along the edges and corners of the units comprising the composite structure;

Figure 3 is a plan view illustrating preferred embodiments of my metal clip for spacing the adjacent units of a composite structure along the edges and corners of the units comprising the composite structure;

Figure 4 illustrates a blank utilized in forming my metal clip from a continuous strip of sheet metal;

Figure 5 is an enlarged perspective view illustrating a modification of my metal clip formed from the blank as illustrated in Figure 4;

Figure 6 is a perspective of a preferred modification of my invention for securing the adjacent corners of two units to another unit;

Figure 7 is a perspective of a preferred embodiment of my invention for spacing and securing the adjacent corners of four units of the composite roof construction of my invention; and,

Figure 8 is a perspective of a still further modification of my invention.

In the present embodiment of the invention as illustrated in Figure 1, a roof deck in the preferred embodiment of the invention supports a plurality of roof blocks 10 which in turn serve to form a composite roof structure surfacing. This composite roof structure 10 is formed by a plurality of units 11 laid in juxtaposition to each other as illustrated.

The unit 11 as illustrated is preferably formed from a relatively coarse fiber structure such as is available on the market generally as fiber insulating board, and which is manufactured by a process involving felting of the fiber from a water suspension of the fiber. The insulating board material which is a felted fiber product manufactured from relatively coarse fiber derived from vegetative sources and contains a large proportion of air space provided by the relatively loose fiber structure. This characteristic imparts to the fiber sheet an appreciable resilience and relatively high insulating value. This particular type of unit 11 is preferably suitably saturated

to the extent of about 150 to 180 per cent of its weight with an asphalt of about 140 to 160° F. M. P. and the surface thereof to be uppermost or exposed may be suitably coated with an asphaltic wear resisting compound over which in turn may be applied a tough and wear resisting surfacing coating, as for example, an asphalt resistant floor paint.

In applying the unit to a roof deck, I preferably use a bitumastic cement. The bitumastic cement is usually applied with a trowel or other suitable device, and preferably the units 11 are laid by suitably placing the units on the layer of bitumastic cement positioned slightly away from the final position which the unit is to occupy, the unit then slid by application of sliding pressure so that the unit is forced preferably, diagonally into the position which it is to occupy. By such procedure of applying the unit in place good contact and adhesion of the unit is obtained as will be understood by those skilled in the art of laying materials of this general character with adhesives of the type which are preferably used in connection with the laying of these units.

In applying the unit 11 to form a composite roof structure 10, the unit 11 is laid and substantially evenly embedded in a bed of mastic which has been combed out and formed with serrations as disclosed in the said copending application of George E. Swenson, so that the unit is slightly out of place with respect to the other units which have been previously laid. The units 11 are successively positioned into their final positions, preferably by being given a slight and substantially arcuate movement to cause the adhesive to be thoroughly applied on the underside of the units.

According to my preferred method of laying a roof structure, or the like, I position by novel metal clip 12 underneath a unit 11, as illustrated in Figure 1, and affix it thereto before bringing into juxtaposition a similar unit 11 which is to be spaced therefrom and affixed thereto with the same metal clip 12. After unit 11 is positioned into place, the units will become firmly affixed to the roof deck or other supporting structures by the adhesive, and the units along adjacent edges will be uniformly spaced one from another. It is preferable, in laying units such as described that each unit will be spaced substantially a quarter of an inch from its adjacent unit along the respective edges of the units. The grooves formed in such a manner are subsequently filled with a suitable mastic or plastic material. Prior to my invention, the edges of the units were set down in a manner well-known in the art, or suitably weighted to prevent the edges of the units from raising before the units are firmly affixed.

It is obvious that with my novel invention that, as the units are placed in juxtaposition, the various corners of each of the structural units are at substantially the same elevation as their adjacent units, therefore, forming a substantially level roof structure, or the like. It is to be understood that it is within the scope of my invention that my novel clip 12 can be secured, if desired, to the supporting structure either by nailing, or by any other suitable method.

In a roof structure such as illustrated in Figure 1, the units 11 are preferably 24" x 48" which are convenient for one person to handle and apply. These units may also be applied by first cutting back the surface with a solvent in order to form an adhesive tacky surface. The

unit may then be applied as has been previously described using my novel metal clip.

It is to be understood that it is within the scope of my invention that the novel metal clips of my invention are equally applicable for applying flooring, or tiling. The finished flooring may comprise practically any of the usual types of flooring, as for example, parquet blocks, narrow tongue and groove strips, and any of the prepared wood block flooring materials or it may comprise rubber tile, linoleum, or the like. It is also to be understood that these units may also be applied by first securing my novel metal clips to the unit about to be applied and then affixing the unit together with the metal clips to the unit to which it is to be secured. It is also within the scope of this invention that the mastic material may be applied to the units direct or to the surface of the supporting structure as has been described, or that in suitable instances the mastic may be dispensed with and the units otherwise suitably secured.

The novel metal clip is illustrated in Figures 1 and 2, for applying and securing the units 11 in juxtaposition and in spaced relationship. It is preferably formed from strips of thin gauge sheet metal. I prefer that my novel metal clip shall be formed in a single operation on a press or the like machine, however, it is within the scope of this invention that the metal clip can be first blanked and then formed into the completed clip 12, as illustrated in Figure 2. The novel clip 12 of my invention comprises a base portion 13 which is adapted to underlie and support units in juxtaposition. Prongs 14 are preferably formed from the base portion 13 as illustrated in Figure 2. The prongs 14 are preferably alternated in direction, as illustrated in Figure 2. The prongs comprise an upwardly extending portion 15 which is adapted to position the adjacent edges of units in juxtaposition substantially $\frac{1}{4}$ " apart. An inwardly and horizontally extending portion 16 on each prong 14 is vertically mounted on the upwardly extended portion 15 substantially one-half the thickness of the unit to which the portion is affixed. The portion 16 is preferably V-shaped at its free end for piercing the felt fiber construction of the units 11. The prongs 14 are preferably formed from notches 17 in the base portion 13, however, it is to be understood that the prongs may be formed by welding or otherwise securing them to the base portion 13. In using my novel clips they are applied, as best illustrated in Figures 1 or 2, along the edges of the various units 11. A sufficient number of the clips 12 are used along the edges of the units to prevent the edges from curling and coming out of alignment and it will also be apparent that as the underface of adjacent units are supported on base portion 13 of the clip, that the upper surfaces of adjacent units will be in planar relation. It is also within the scope of my invention, wherever necessary, that the clip 12 may be nailed or otherwise secured to the supporting structure.

Referring to Figures 3, 4 and 5, I will now describe a preferred modification of my novel invention for an improvement in a metal securing clip. A preferred form of my metal clip 18 is preferably formed from a continuous strip of sheet metal 19. Referring to Figure 4, a blank 20, as illustrated, is the preferred shape of the blank from which I form my preferred modification of the clip 18. As illustrated in Figure 4, there is disclosed a blank from which the clip 18 is formed without any waste in material. In

forming clip 18, I prefer to fabricate it in a continuous operation by blanking it and forming it from the continuous strip 19 in one operation or stroke of the press. However, it is to be understood that it is within the scope of the invention that the clip may be formed by blanking, splitting, and then forming the clip into its final form, or it may be formed by any determined sequence of the operations for its formation.

Referring to Figure 4, it is preferable to shear the blank 20 from the strip 19, preferably along the line or edges 21 of the completed clip. With a suitable die and press operation, the prongs 22 are formed in one operation by shearing the blank 20 as at 23. The die used in the press operation forms a vertical upstanding portion 24, preferably along the dotted line 25 as illustrated in Figure 4. It is obvious that with one stroke of the press the punch and die suitably forms base portion 26 and horizontal portion 27 of the prong 22 thus substantially finishing the formation of the preferred modification of the metal clip 18, as illustrated in Figure 5. The horizontal portion 27 of the prong 22 are preferably vertically positioned at substantially $\frac{1}{2}$ the thickness of the unit 11 with which the clips 18 are to be used. It is obvious from Figure 5 that a suitably pointed prong 27 is formed which will readily pierce the edges of the felt fiber unit with which the clips are to be used. The material from which the clips 18 are formed is preferably of such a thickness that a rigid clip is fabricated and one which may readily be forced into the units 11, either by hand, by a hammer, or other suitable tool.

The novel clip 18 of my invention not only serves to keep the edges of the unit 11 in a plane surface with respect to the top surface of the composite structure, but the clip also serves to form a suitable space or groove 28 between the units 11 of the composite roof structure 10 or the like construction, as illustrated in Figure 1, for the application of a suitable mastic of bitumastic or bitustatic material to thoroughly seal and waterproof the joints between the units forming the composite roof structure or the like. To suitably gauge the space or groove 28 between the units 11 vertical prongs 29 may be provided.

The prongs 29 are preferably formed in the same operation that forms the completed metal clip 18. In forming the prongs 29 they are preferably formed by splitting or shearing the blank 20 along the lines 30, as illustrated in Figure 4. The prongs 29 are so positioned on the clip 18 that they are in alignment with the vertical upstanding portion 24 of the clip, Figures 5 and 7, and at right angles to the vertical upstanding portion 24, Figures 6 and 7, for aligning and spacing contiguous units. It is obvious that as the prongs 27 are forced into the units 11, the units along the respective edges will abut against the upstanding prongs 29, as best illustrated in Figure 3.

In Figures 3, 6 and 7, I illustrate two preferred species of my metal clip 18. In Figure 6, there is illustrated a novel triangular shaped 3-prong clip 31. The clip 31, as illustrated in Figure 3, is suitably formed to support the contiguous corners of two units 11 and to suitably space three units, as illustrated in Figure 3, wherein the units are laid in a formation to break the joints.

A unit 32, as illustrated in Figures 3 and 7, is a 4-pronged clip adapted to secure and space the contiguous corners of four adjacent units. The clip 32 is preferably formed either from a rectangular or square shaped blank. Since the clips 31

and 32 are preferably formed in one operation with suitable dies mounted in a press, as has been previously disclosed with reference to the fabrication of the clip 18, illustrated in Figures 4 and 5, it is believed that further disclosure of the formation of the clips 31 and 32 is not necessary to one skilled in the art in view of the disclosure for the formation of the clip 18. Since the clips 18, 31 and 32 are similarly formed like reference characters will therefore indicate similar parts of the fabricated clip.

It is obvious from the disclosure, as illustrated in Figures 6 and 7, that these clips 31 and 32 are preferably formed with a minimum amount of sheet metal material. The prongs 22 of these units or metal clips are also readily adapted to be forced into the units 11 either by hand or with a hammer or other suitable tool. It is apparent from the disclosure that the base portion 26 serves to support adjacent units of the composite roof structure or the like at a substantially uniform height so that the corners and edges of the units 11 will always be substantially in a level plane.

Referring to Figure 8, I illustrate another modification of my novel metal clip. The clip 33 is also preferably formed from a continuous strip of sheet metal. Prongs 34 are suitably blanked from the strip material to form suitable means for securing in spaced relationship units 11 of the composite roof structure, as illustrated in Figure 1. A vertical portion 35 serves to act as a support for the clip 33 as well as a gauge for the space 28 between the units 11. When the clip 33 is used to space the units 11, as illustrated in Figure 1, the edges 36 of the vertical portion 35 act as a gauge and stop for the units 11 to provide the desired spacings. The prongs 34 are preferably formed with a suitable die in a single operation and are given substantially a quarter twist to offset the prongs themselves substantially 90° from the vertical portion 35. The vertical portion 35 may be slitted as at 37 and bent outwardly as illustrated to form a suitable grip on the mastic when it is laid in the groove 28 formed by the clip 33 between adjacent units 11.

It is obvious from the foregoing that I have disclosed a novel metal clip and modification thereof for suitably supporting and affixing adjacent units preferably of a felted fiber construction which are used in composite roof structure. However, it is within the scope of my invention that these units may be formed of wood, metal, cement, or other material and so adapted as to receive the clips formed as disclosed, and laid to form a composite roof structure, or other planar surface. Furthermore, it is obvious that a novel metal clip has been formed which is adapted to readily underlie and support the unit forming the composite roof structure or the like, and also clips which are readily formed by blanking in a single operation with the use of a suitable die. Although it is preferable in laying the units forming the composite roof structure that these units are laid in a mastic or adhesive without the use of nails, or the like. However, wherever it is necessary, it is obvious that the metal clips 12, 18, 31 and 32 have formed therein suitable means for gripping the underlying supporting structure. This means may take the form of a punched-out portion of the base portion 26 caused by piercing with a suitable tool and best illustrated as at 38 in the metal clips 18, 31 and 32, Figures 3, 5, 6 and 7. It is also obvious that the metal clips 12, 18, 31 and 32 may be affixed to a suitable supporting structure with

a nail either driven through the base portion 26 or through the hole provided by the means 38.

It is also obvious from the disclosure, as illustrated in Figures 1, 2, and 3 that with my preferred metal clips and modifications thereof, it is very simple for even the most unskilled artisan to lay a composite roof structure or the like, fabricated from separate units so that there is formed a suitable and uniform space between the units for the application of a suitable mastic or adhesive between to seal the joints. Similarly, it is obvious from Figure 3 that one can readily lay the contiguous corners of adjacent units at uniform spacing at all times.

While the above novel metal clip, together with preferred modifications thereof, illustrates a preferred embodiment of the invention, together with a preferred method of forming my novel metal clip and for laying composite roof structures or the like, the details of construction of the metal clips, the method of forming the clip, and the laying of the composite roof structure or the like by the use of these clips as described are not essential and may be varied without departure from the scope of my invention as defined in the following claims.

What I claim is:

1. A clip of sheet metal for cooperation with a supporting structure and prefabricated structural units in juxtaposition comprising a base portion adapted to underly the contiguous corners of the structural units, and prongs adapted to pierce adjacent edges of the structural units at points removed a substantial distance from the contiguous corners of adjacent units to resist splitting of the structural units and laterally space the units a substantial distance.

2. A clip of sheet metal for cooperation with a supporting structure and prefabricated structural units in juxtaposition comprising a base portion adapted to underly the contiguous corners of the structural units, prongs adapted to engage adjacent edges of the structural units and laterally space the units a substantial distance, and said prongs engaging in adjacent edges of the structural units at points removed a substantial distance from the contiguous corners of adjacent units to resist splitting of the structural units.

3. A clip of sheet metal for cooperation with a supporting structure and prefabricated structural units in juxtaposition comprising a base portion adapted to underly the contiguous corners of the structural units, prongs adapted to pierce adjacent edges of the structural units at points removed a substantial distance from the contiguous corners of adjacent units to resist splitting of the structural units and laterally space the units a substantial distance, and said prongs formed from the base portion.

4. A fastening element for prefabricated structural units comprising a clip of sheet metal having a base portion and prongs alternately formed from the base portion and adapted to pierce adjacent opposite structural units at points removed a substantial distance to resist splitting of the structural units and laterally space the structural units a substantial distance.

5. A fastening element for prefabricated structural units comprising a clip of sheet metal formed in the shape of a parallelogram, prongs struck up at diagonally opposite acutely angular

corners of the parallelogram, the opposite obtusely angular corners comprising base portions adapted to underly the structural units, and said prongs adapted to pierce the edges of adjacent structural units and laterally space the structural units a substantial distance.

6. A fastening element for prefabricated structural units comprising a clip of sheet metal formed to pierce the edges of a plurality of the structural units and having a base portion and adapted to pierce the edges of adjacent structural units, prongs formed from the base portion, and means split and formed from the base portion adapted to laterally space the structural units in conjunction with the prongs.

7. A fastening element for prefabricated structural units comprising a clip of sheet metal having a base portion, prongs formed from the base portion, each of said prongs comprising a vertically upstanding portion and a horizontally extending portion adapted to pierce a structural unit, and means struck from the base portion in alignment with the vertically upstanding portions of the prongs adapted to laterally space the structural units in cooperation with the prongs.

8. A fastening element adapted for spacing and affixing prefabricated structural units having their corners contiguous comprising a clip of sheet metal substantially quadrilateral in shape, having a base portion, prongs formed from the base portion at corners of the quadrilateral along a diagonal thereof, the prongs at opposite corners of the diagonal formed on opposite sides of the diagonal whereby a piercing point for each prong is formed at the intersection of the diagonal and adjacent edges of the quadrilateral, whereby the prongs are adapted to engage the structural units and the base portions adjacent the prongs are adapted to underly the structural units.

9. A fastening element adapted for spacing and affixing structural units having their edges adjacent comprising a clip of sheet metal substantially quadrilateral in shape having a base portion, prongs formed from the base portion at corners of the quadrilateral, the prongs at opposite corners formed by the acute angles of the quadrilateral between adjacent sides of the quadrilateral and sheared part way along a line substantially midway between the opposite sides of the quadrilateral whereby a piercing point for each prong is formed by portions of adjacent sides of the quadrilateral and the sheared edge, whereby the prongs are adapted to engage adjacent edges of the structural units and the base portions adjacent the prongs to underly the structural units.

10. A fastening element adapted for spacing and affixing prefabricated structural units having the contiguous corners of two structural units in juxtaposition to an edge of an adjacent unit comprising a clip of sheet metal substantially triangular in shape having a base portion, prongs formed from the base portion at each apex of the triangle, means struck from the base portion adapted to laterally space the structural units in cooperation with the prongs, and two of said prongs formed by shearing along a line substantially parallel to one of the bases of the triangle.

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