July 6, 1971 K. A. SCHAFER 3,591,437

METHOD OF MAKING A PLASTIC BUILDING WALL FIN UNIT

Filed July 1, 1968

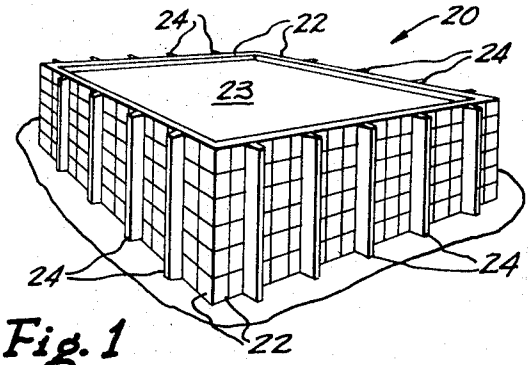


Fig. 1

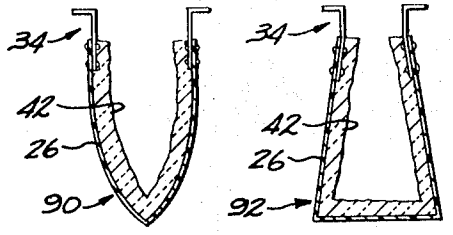


Fig. 8 Fig. 9

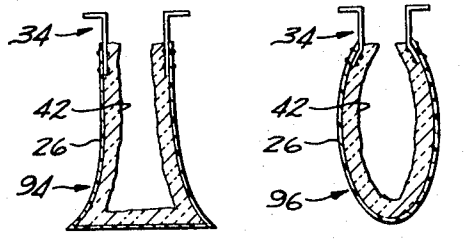


Fig. 10 Fig. 11

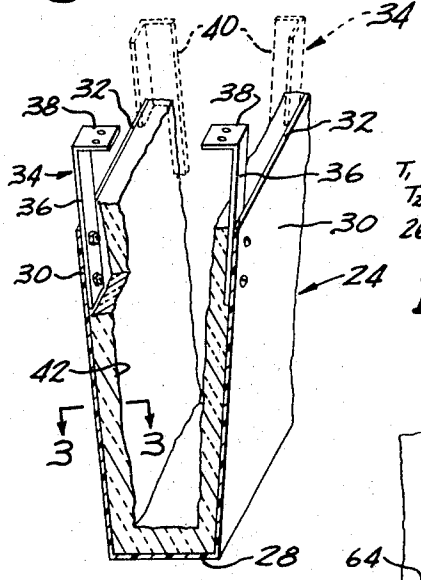


Fig. 2

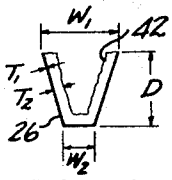


Fig. 12

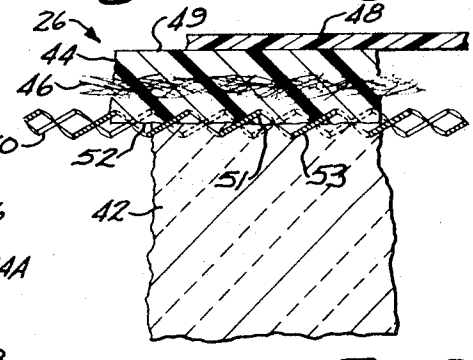


Fig. 3

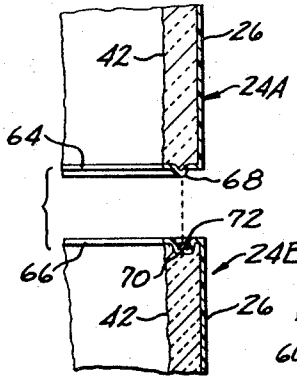


Fig. 6

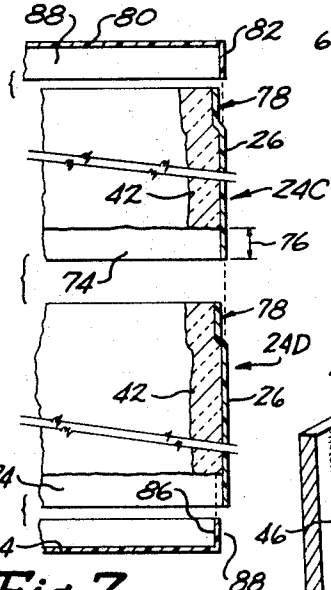


Fig. 7

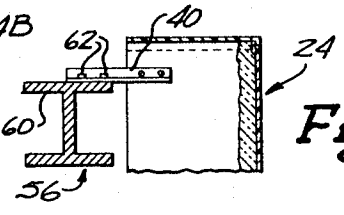


Fig. 5

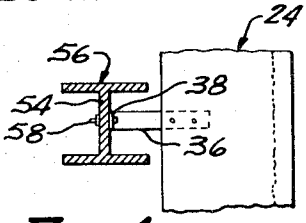


Fig. 4

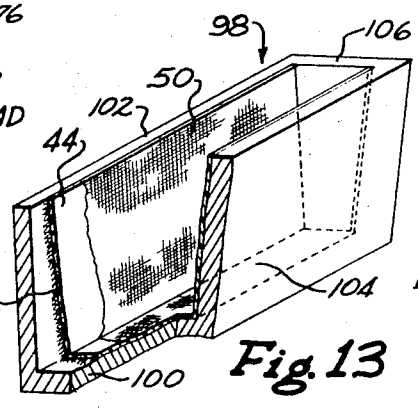


Fig. 13

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METHOD OF MAKING A PLASTIC BUILDING WALL FIN UNIT

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ABSTRACT OF THE DISCLOSURE

A prefabricated plastic building wall fin unit comprising a generally U-shaped reinforced plastic shell having bracket means for securing the fin unit to a building wall. Fireproofing material may be applied to the interior surface of the shell. A foraminous reinforcement may be partially embedded in the shell to provide positive connection for the fireproofing material and to provide structural reinforcement for the shell.

BACKGROUND OF THE INVENTION

(1) Field of the invention

This invention relates to a prefabricated plastic building wall fin unit, and method of making the same and more particularly to a fin unit adapted for erection with a building wall for service as an architectural column-like building feature element.

(2) Description of the prior art

Building wall fins are used extensively in new building structures. The wall fins project outwardly from the exterior wall of the building and serve as prominent feature elements. The wall fins interrupt the large expanse of essentially flat wall areas and render these wall areas more attractive. The wall fins normally are non-load bearing elements.

In the past, the building wall fins have comprised pre-cast concrete elements having a "white" appearance.

The use of pre-cast concrete wall fins has many disadvantages. The weight of pre-cast concrete wall fins is great. For example, a recently erected building incoporates a plurality of 26 feet long, pre-cast concrete wall fins having a weight per foot of length of fin of 770 pounds or a gross weight of 10 tons each. In a proposed building, the pre-cast concrete wall fins would have a weight per foot of length of fin of 300 pounds. The great weight of the pre-cast concrete wall fins adds considerably to the structural steel tonnage of the building frame and to the foundation costs. Additionally, complicated wall fin-to-spandrel beam connections are required and expensive erection procedures are necessary. The use of pre-cast concrete in fins is not an efficient use of materials since the wall fins are non-load bearing elements.

SUMMARY OF THE INVENTION

The principal object of this invention is to provide a building wall fin unit which is relatively light in weight and which may be produced in a variety of architectural configurations.

Another object of this invention is to provide a building wall fin which does not have the disadvantages of the prior art pre-cast concrete wall fins.

A further object of this invention is to provide a method of making a plastic building wall fin unit.

The present invention provides a prefabricated building wall fin comprising a generally U-shaped reinforced plastic shell having spaced-apart inboard longitudinal edges. A lath-like reinforcement, such as an expanded metal screen, may be embedded in the interior surface

of the reinforced plastic shell such that surfaces thereof project from the interior of the shell. A lightweight fireproofing material may be provided on the interior surface of the reinforced plastic shell and is mechanically secured thereto by the lath-like reinforcement. Bracket means having one end secured to the reinforced plastic shell project at the other end away from the inboard longitudinal edges of the reinforced plastic shell and adapt the building wall fin unit for erection to a building structural framework.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a building provided with building wall fin units of this invention;

FIG. 2 is a fragmentary isometric view illustrating the present building wall fin unit and alternative bracket means adapting the fin unit for erection to a building wall;

FIG. 3 is a cross-sectional view, on an enlarged scale, taken along the line 3—3 of FIG. 2;

FIGS. 4 and 5 are fragmentary side views illustrating typical structures for securing the present building wall fin unit to a building framework;

FIG. 6 is an exploded side view, in cross-section, illustrating a butt joint between two vertically aligned fin units of this invention;

FIG. 7 is an exploded side view, in cross-section, illustrating an overlapped connection between two vertically aligned fin units of this invention;

FIGS. 8–11, inclusive, are transverse cross-sectional views, illustrating alternative configurations of the present building wall fin unit;

FIG. 12 is a schematic end view of the present building wall fin unit, illustrating various dimensions; and

FIG. 13 is a fragmentary isometric view of mold apparatus employed in the manufacture of the present building wall fin unit.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

FIG. 1 illustrates a building **20** having exterior walls **22** and a roof **23**. Each of the exterior walls **22** is provided with a plurality of building wall fin units **24**. The wall fin units project outwardly from the exterior wall **22** and may extend from ground level to the level of the roof **23**. The wall fin units **24** are prominent feature elements which interrupt the large expanse of flat area which the exterior walls **22** would present in the absence of the wall fin units **24**.

Referring to FIG. 2, the present building wall fin unit **24** comprises a generally U-shaped shell **26** fabricated from reinforced plastic and including a base **28** and two legs **30** terminating in spaced-apart inboard longitudinal edges **32**. The building wall fin unit **24** is provided with bracket means **34**, such as plate members **36** which are secured to the shell **26** and have terminal mounting portions **38** which are usually coplanar. Alternatively, the building wall fin unit **24** may, instead, be provided with bracket means **34**, such as structural angles **40**, shown in dotted outline, which are secured to the shell **26**.

If desired, a lightweight fireproofing material **42** may be applied to the inner surfaces of the web **28** and the legs **30** of the building wall fin unit **24**. Lightweight fireproofing materials suitable for use in the present invention include vermiculite, sprayed fibrous materials, foamed gypsum, and the like.

Referring to FIG. 3, the shell **26** comprises a cured thermoset resinous mass **44** which engulfs and surrounds reinforcing fibers **46**. If desired, a weather resistant film **48** may be secured to an exterior surface **49** of the resinous mass **44** during fabrication of the shell **26**. The

weather resistant film **48** may comprise polyvinyl fluoride having a thickness in the range of from 1 to 5 mils. The film **48** constitutes the exposed surface of the building wall fin unit **24**.

Additional reinforcing means may be provided for reinforcing the shell **26**. The additional reinforcing means may comprise lath material, such as an expanded metal screen **50**. As can be seen in FIG. 3, the expanded metal screen **50** has surfaces **51** embedded in the resinous mass **44** and surfaces **53** projecting from the inner surface **52** of the resinous mass **44**.

The lightweight fireproofing material **42** is applied to the inner surface **52** of the resinous mass **44** whereby the surfaces **53** of the expanded metal screen **50** comprise bonding and reinforcing means interposed between the lightweight fireproofing material **42** and the reinforced plastic shell **26** for mechanically bonding the fireproofing material **42** to the shell **26** and for additionally reinforcing the shell **26**. The expanded metal screen **50** has surfaces **51** embedded in the reinforced plastic shell **26** and has surfaces **53** embedded in the fireproofing material **42**.

The cured thermoset resinous mass **44** may comprise any suitable resinous composition including, unsaturated polyesters, epoxy and other thermosetting resins.

The reinforcing fibers **46** may comprise preformed mats of randomly oriented glass fibers. Alternatively, the reinforcing fibers may comprise short glass fibers such as provided by convention spray techniques wherein short glass fibers and a liquid polymerizable resinous composition are simultaneously sprayed onto surfaces of a pattern or mold. Examples of other suitable reinforcing fibers include synthetic organic fibers such as polyester or polyamide fibers and the like.

As shown in FIG. 4, the building wall fin unit **24** can be erected by securing the terminal mounting portions **38** of the plate members **36** to a vertical web **54** of a horizontal girt **56** by suitable fasteners **58**.

As shown in FIG. 5, the building wall fin unit **24** can be erected by securing the structural angles **40** to one of the horizontal flanges **60** of the horizontal girt **56** by suitable fasteners **62**.

Referring to FIG. 6, there is illustrated a butt joint between two building wall fin units **24A**, **24B**. Each of the building wall fin units **24A**, **24B** are provided with upper and lower flanges **64**, **66**, respectively, which extend inwardly of the shell **26**. The lower flange **64** is provided with a bead **68** and the upper flange **66** is provided with a complementary groove **70**. A sealant material **72** is provided in the complementary groove **70**. The bead **68** and complementary groove **70** serve to maintain the building wall fin units **24A**, **24B** in vertically aligned relation. Moreover, engagement of the bead **68** with the sealant material **72** seals the butt joint between the building wall fin units **24A**, **24B**.

Referring to FIG. 7, there is illustrated two vertically aligned building wall fin units **24C**, **24D** positioned to be assembled in top-to-bottom overlapping relationship. In this arrangement, the shell **26** and the lightweight fireproofing material **42** are coterminating at their upper ends. The shell **26** has a flange portion **74** extending downwardly beyond the lightweight fireproofing material **42** at the bottom end of the fin unit **24C** for a lapping distance indicated at **76**. Additionally, the shell **26** is inwardly recessed as at **78** at the upper end of the fin unit **24C** for a distance corresponding to the lapping distance **76**. As shown in FIG. 7, the subjacent wall fin unit **24D** is inwardly recessed at **98**. The overall arrangement is such that the two building wall fin units **24C**, **24D** can be assembled in top-to-bottom overlapping relation.

Referring still to FIG. 7, the upper end of the fin unit **24C** may be provided with a closure element **80** having a depending flange **82**. When the closure element **80** is installed, the depending flange **82** engages the exterior surface of the shell **26** in the region of the recess **78**.

The lower end of the fin unit **24D** also may be provided with a closure element **84** having a peripheral flange **86**. When the closure element **84** is installed, the peripheral flange **86** engages the interior surface of the flange portion **74**.

The closure elements **80**, **84** may be adhesively secured to the shells **26** by a suitable adhesive **88**. The adhesive **88** may be applied, for example, to the inner surface of the depending flange **82** of the closure element **80**, and to the exterior surface of the peripheral flange **86** of the closure element **84**, as illustrated in FIG. 7. Suitable adhesives include asphalts, epoxy adhesives, polyurethane sealants, et cetera. Alternatively, the closure elements **80**, **84** may be secured to the shell **26** by any suitable fastener elements.

The present building wall fin unit can be provided in the profile of FIG. 2 and other profiles, such as illustrated in FIGS. 8–11, inclusive. The building wall fin units **90**, **92**, **94** and **96** of FIGS. 8–11, respectively, include a fiber reinforced plastic shell **26**, lightweight fireproofing material **42**, and expanded metal screen (not visible) securing the fireproofing material **42** to the shell **26**, and bracket means **34**.

EXAMPLE

A comparison is presented between the wall fins of this invention and the presently available pre-cast concrete wall fins in the trapezoid profile shown in FIG. 12.

The wall fin dimensions indicated in FIG. 12 are summarized in Table A. It is to be noted that the pre-cast concrete wall fin has a solid trapezoidal profile whereas the wall fin on this invention has a generally U-shaped profile shown in FIG. 12. Accordingly, a pre-cast concrete wall fin has no counterpart dimension to the thicknesses T_1, T_2 or their sum.

TABLE A

Dimension, FIG. 14	Pre-cast concrete wall fins	Wall fin unit this invention
D, inches	19	19
W_1, inches	18	18
W_2, inches	10	10
T_1, inches	(1)	0.25
T_2, inches	(1)	0.75
Density, pounds per cu. ft.		
Concrete	150	
Shell 26		87–100
Fireproofing 42		10–12
Expanded metal screen, pounds per sq. ft		0.5

[1] Solid concrete.

A comparison of the weights of the wall fins in a typical building is given below in Table B.

TABLE B

Item	Pre-cast concrete wall fins	Wall fin unit this invention
Total linear feet	64,000	64,000
Weight per linear foot, pounds	300	[1] 10.6
Gross weight, tons	9,600	339
Building structural steel frame, tons [2]	10,000	9,000

[1] Based on the average density of the shell 26 material and of the fireproofing material 42.
[2] Includes weight of structural steel frame required to support the wall fins.

As can be seen from Table B the gross weight of the present wall fin units is only 3.5 percent of the gross weight of the pre-cast concrete wall fins. Also, the present wal fin units permit a reduction of approximately 1,000 tons or 10 percent of the building structural steel framing which would be required in the typical building herein considered, if the pre-cast concrete wall fins are used.

METHOD

Referring to FIG. 13, there is illustrated a pattern or mold **98** for producing the wall fin unit **24** of FIG. 2. The pattern **98** has a trough-like configuration including a bottom wall **100**, diverging side walls **102**, **104** and end walls **106** (only one shown). The bottom wall **100** and the diverging side walls **102**, **104** may have plain interior surfaces or may have interior surfaces which are textured

to correspond with the texture of various materials, such as concrete, for example.

In accordance with one embodiment of the present method of making prefabricated plastic building wall fin units, the reinforcing fibers **46**, in the form of preformed mats of randomly oriented reinforcing fibers, are applied to the interior surfaces of the walls **100, 102** and **104** of the pattern **98**. A liquid thermosetting resinous composition is applied to the preformed mats in a quantity sufficient to engulf and surround the same. The liquid thermosetting resinous composition is allowed to cure partially and thereafter, the lath material **50** is applied to the exposed surfaces of the partially cured thermosetting resinuous composition, such that the lath material **50** is partially embedded in the partially cured thermosetting resinous composition. The partially cured resinous composition, the preformed mats of randomly oriented reinforcing fibers and the lath material are retained in assembled relation within the pattern until the resinous composition has substantially completely cured.

After the thermosetting resinous composition has cured, a layer of lightweight fireproofing material (not shown) may be applied to the interior surfaces of the shell **26**. The lightweight fireproofing material is mechanically bonded to the thermosetting resinous composition by embedment of the exposed portions of the lath material **50** in the fireproofing material.

In accordance with an alternative embodiment of the present method of making prefabricated plastic building wall fin units, the reinforcing fibers **46** and the liquid thermosetting resinous composition are applied simultaneously to the pattern **98** by conventional spraying techniques. In this instances, short lengths of reinforcing fibers are sprayed along with a stream of liquid thermosetting resinous composition against the pattern **98**, whereby the resin-coated reinforcing fibers are arrayed in random orientation.

If desired, a film of weather resistant material, such as the film **48** (FIG. 3) may be applied to the interior surfaces of the walls **100, 102** and **104** of the pattern **98** prior to the application of the reinforcing fibers **46** and the liquid thermosetting resinous composition. In this instance, the film also serves as a mold release agent.

The shell **26** may be formed from thermosetting resinous compositions of various colors. The resulting building wall fin may have a color which blends with the color of the building or may have a contrasting color to render the building wall fins more prominent. Furthermore, the thermosetting resinous composition may have a mottled color or pattern to produce a surface appearance in imitation of marble. An appearance simulating that of white concrete may be achieved by suitable white pigmentation of the plastic substance.

SUMMARY

The present invention provides a building wall fin unit which is lightweight when compared with the prior art precast concrete wall fins; which may be produced in a variety of architectural configurations and in any of a variety of colors; which may be produced with a plain or a textured surface in imitation of marble, concrete or the like; and which does not have the many disadvantages of the prior art pre-cast concrete wall fins. The present invention also provides a novel method for making a building wall fin unit.

What is claimed is:

1. The method of making a building wall fin unit comprising the steps of:

applying reinforcing fibers to surfaces of a pattern;

applying a liquid thermosetting resinous composition to said reinforcing fibers to engulf and surround the same;

partially curing said thermosetting resinous composition;

applying a lath material to the exposed surfaces of said partially cured thermosetting resinous composition such that said lath material has surfaces embedded in said partially cured thermosetting resinous composition and surfaces projecting therefrom; and

retaining said partially cured thermosetting resinous composition, said reinforcing fibers and the said lath material in assembled relation within said pattern until said partially cured resinous composition has substantially completely cured.

2. The method defined in claim **1** wherein said reinforcing fibers are applied as mats of randomly oriented glass fibers.

3. The method defined in claim **1** wherein said reinforcing fibers and said liquid thermosetting resinous composition are applied concurrently to surfaces of said pattern.

4. The method defined in claim **1** including the step of applying a layer of lightweight fireproofing material to said lath material and the said thermosetting resinous composition after said thermosetting resinous composition has substantially completely cured.

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U.S. Cl. X.R.

52—309; 161—170, 403; 156—276, 298, 300