



US008991137B2

(12) **United States Patent**
Molinelli

(10) **Patent No.:** **US 8,991,137 B2**
(45) **Date of Patent:** **Mar. 31, 2015**

(54) **METHOD OF MAKING HOUSING COMPONENTS**

USPC 52/782.1, 783.11, 783.12, 783.17,
52/783.19, 784.1, 787.11, 798.1;
264/32-33; 249/28-32, 175-178, 183,
249/188

(71) Applicant: **Michael Molinelli**, Briarcliff Manor, NY (US)

See application file for complete search history.

(72) Inventor: **Michael Molinelli**, Briarcliff Manor, NY (US)

(56) **References Cited**

(73) Assignees: **St Bungalow LLC**, Briarcliff Manor, NY (US); **Michael Molinelli**, Briarcliff Manor, NY (US)

U.S. PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

3,278,116	A *	10/1966	Petty	52/750
3,397,497	A *	8/1968	Shea et al.	52/334
3,592,437	A *	7/1971	Dashew	249/175
3,871,278	A *	3/1975	Shoemaker	105/378
4,041,671	A *	8/1977	Nicholson	52/745.07
4,149,351	A *	4/1979	Belt	52/745.07
5,105,590	A *	4/1992	Dykman	52/745.01
5,397,096	A *	3/1995	Nelson	249/31
7,028,436	B2 *	4/2006	Bezubic, Jr.	52/288.1
8,104,233	B2	1/2012	Wilsey	
8,444,722	B2 *	5/2013	Richey	44/605
2004/0128936	A1 *	7/2004	Gilbert	52/604
2007/0294954	A1 *	12/2007	Barrett et al.	52/36.2

(21) Appl. No.: **14/196,060**

(22) Filed: **Mar. 4, 2014**

(65) **Prior Publication Data**

US 2014/0245691 A1 Sep. 4, 2014

Related U.S. Application Data

(60) Provisional application No. 61/772,040, filed on Mar. 4, 2013.

(51) **Int. Cl.**
E04G 11/46 (2006.01)
E04C 2/04 (2006.01)
B28B 7/00 (2006.01)

(52) **U.S. Cl.**
CPC **E04C 2/041** (2013.01); **B28B 7/0032** (2013.01); **B28B 7/0055** (2013.01); **B28B 7/0088** (2013.01); **B28B 7/0094** (2013.01)
USPC **52/783.11**; 52/783.17; 52/783.19; 52/798.1; 249/28; 249/30; 249/176; 249/188

(58) **Field of Classification Search**
CPC .. B28B 7/0032; B28B 7/0055; B28B 7/0088; B28B 7/0094; E04G 11/46

FOREIGN PATENT DOCUMENTS

GB 2491649 A * 12/2012

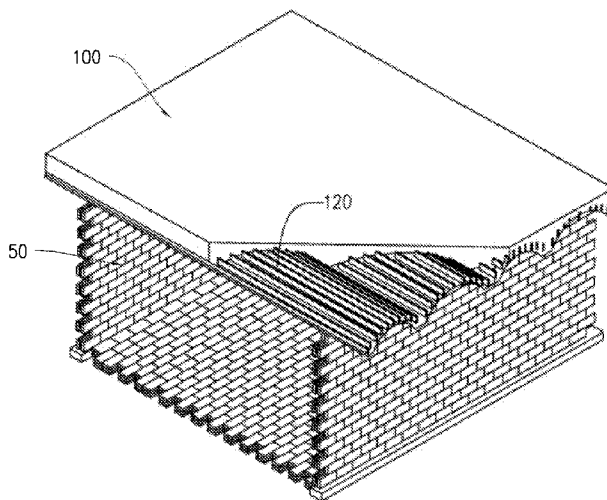
* cited by examiner

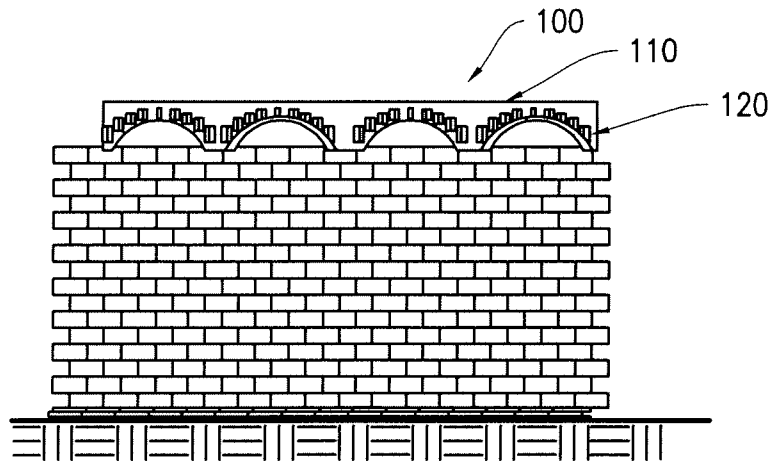
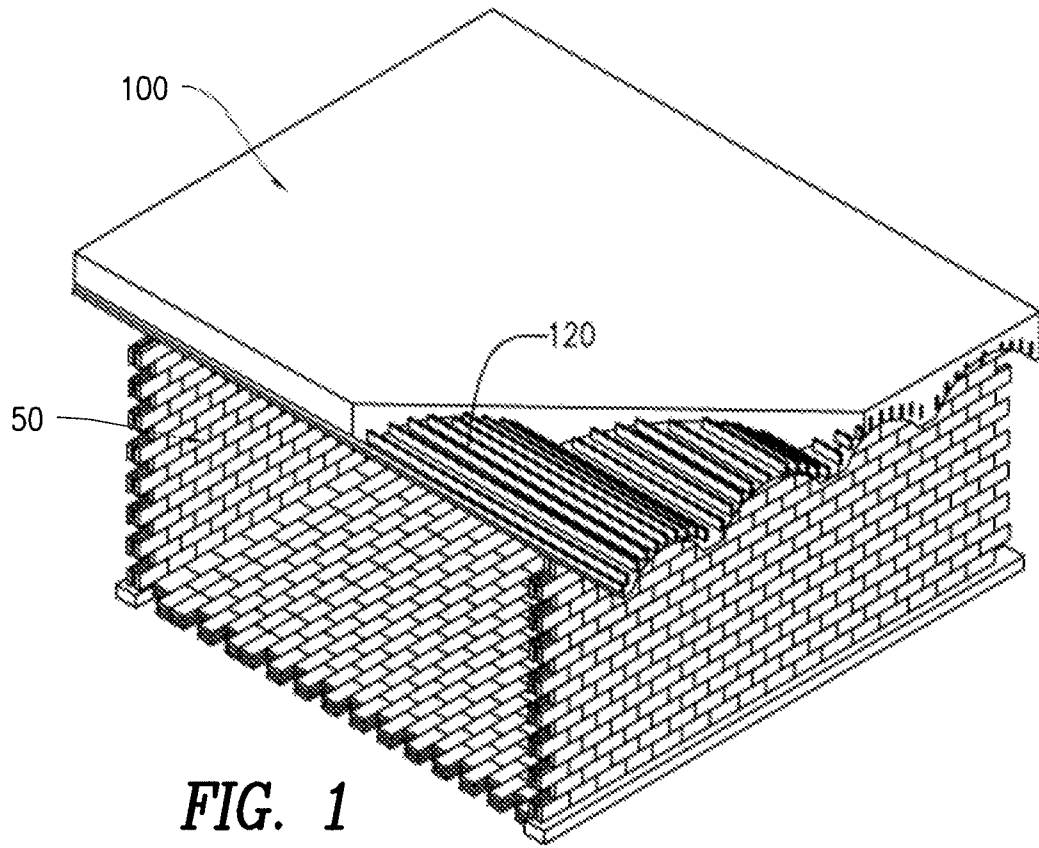
Primary Examiner — Jeanette E Chapman
(74) *Attorney, Agent, or Firm* — Keith D. Nowak; Libby Babu Varghese; Carter Ledyard & Milburn LLP

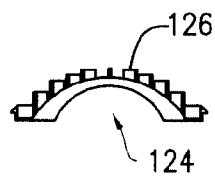
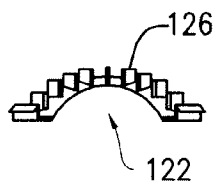
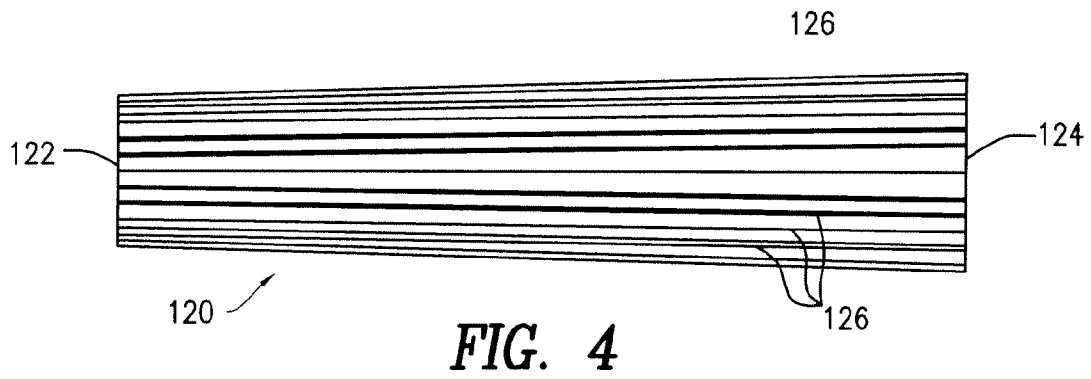
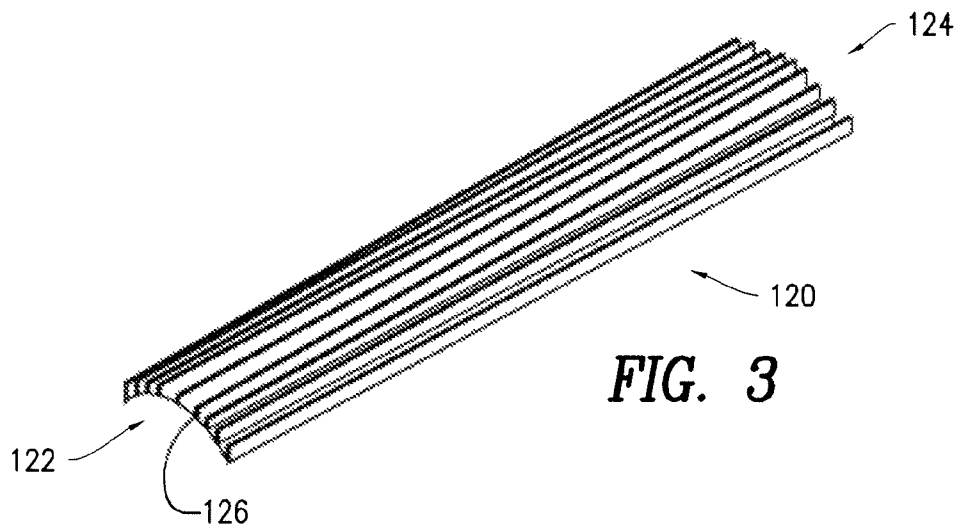
(57) **ABSTRACT**

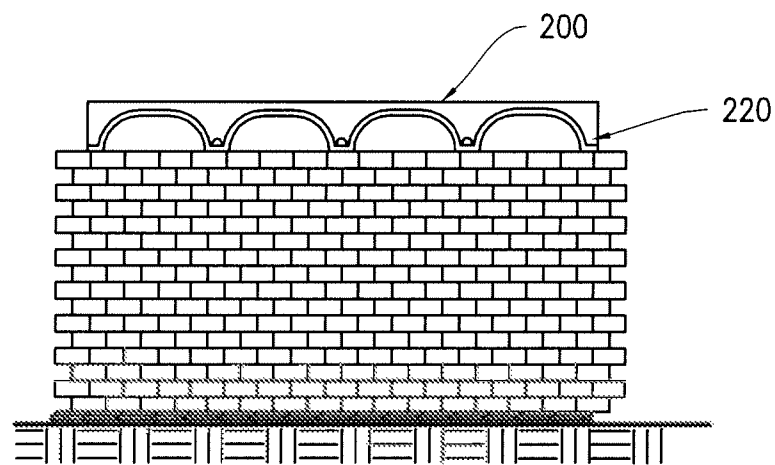
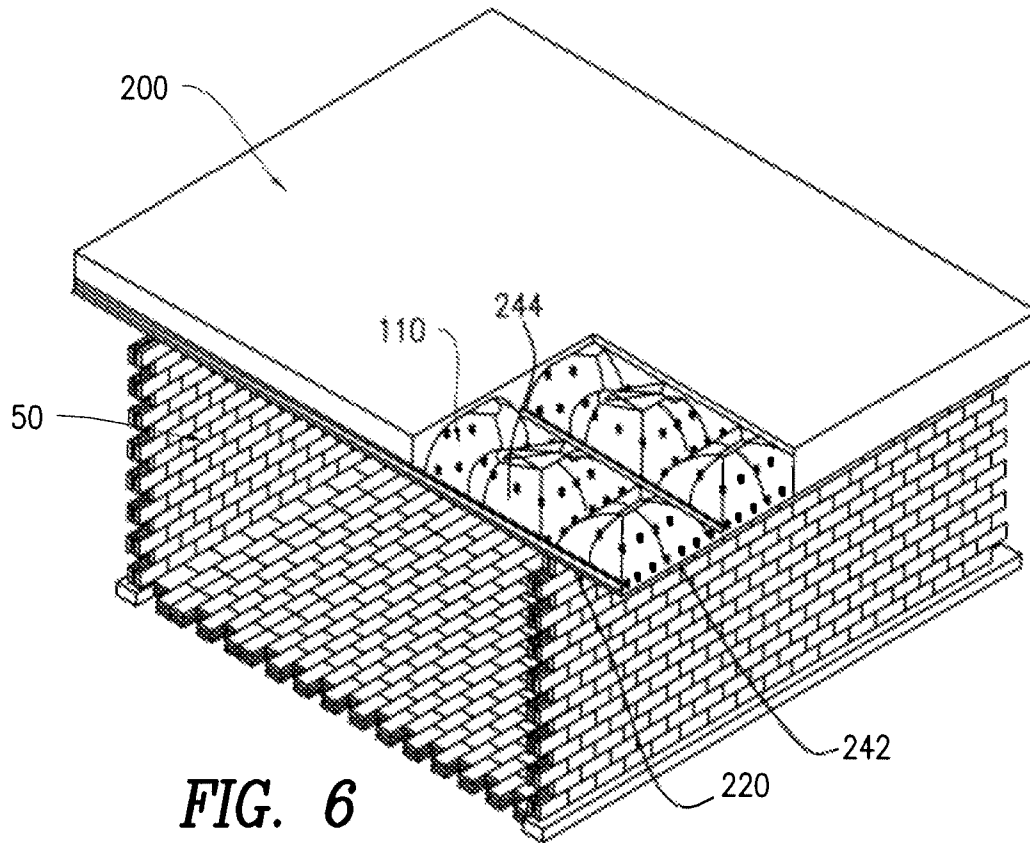
A housing component system having fiberglass resin forms secured in place with a binder such as cement. The forms may have a variety of forms and once secured with the cement will be strong avoiding the need for any reinforcement components such as reinforcing bar (rebars) of metal mesh.

9 Claims, 4 Drawing Sheets









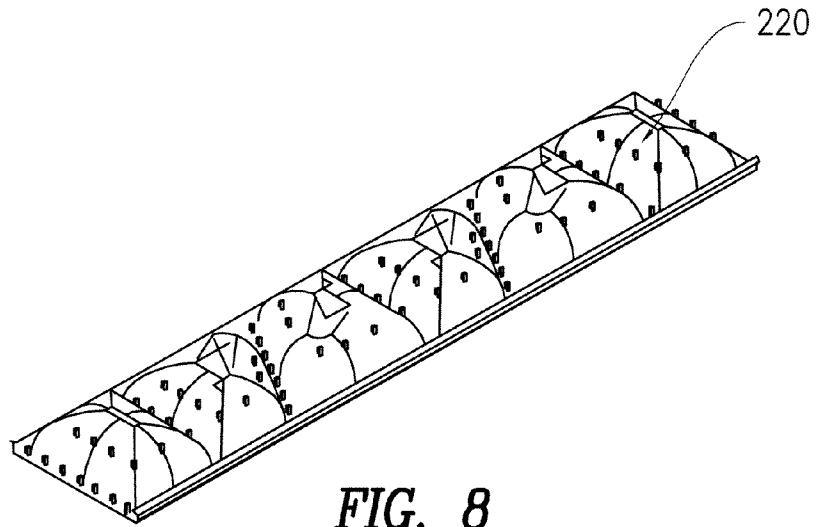


FIG. 8

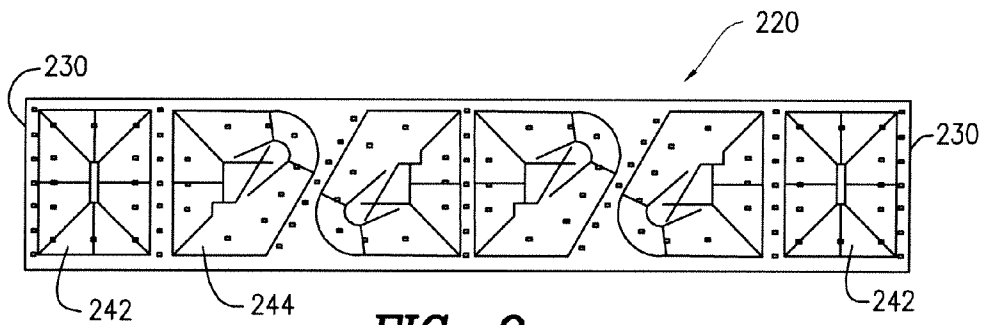


FIG. 9

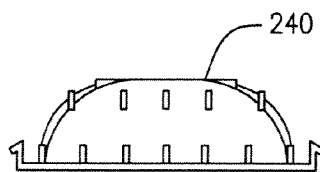


FIG. 10

1

METHOD OF MAKING HOUSING COMPONENTS

PRIORITY AND RELATED APPLICATION

This application claims priority to U.S. Provisional Patent Application Ser. No. 61/772,040, filed Mar. 4, 2013, entitled "Method of Making a Roof," which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates to a method of making parts of housing such as walls or roofs.

BACKGROUND OF THE INVENTION

Today many people in the world are without decent housing, or any housing at all. In addition, houses that are off-grid have no energy supply, beyond what can be obtained from primitive means, such as wood, kerosene, etc. A solar powered eco-friendly home or "solar bungalow" would be ideal for solving this need. In much of Africa, and in other parts of the world, families without access to electricity rely on kerosene lamps. Expensive, unsafe and unhealthy, they also provide only a dim light. But while solar alternatives are far cleaner and cheaper, widespread use of this technology will rely on innovative forms of payment and distribution. Inexpensive housing units that offer the possibility of simultaneously attaching solar panels will be of great benefit. Such housing units will have to be affordable and preferably eco-friendly. Housing units comprised of compressed earth bricks are an example of the kind of buildings needed. Corresponding inexpensive housing parts such as roofs for these housing units are of equal importance in order to bring down the overall price of the housing unit.

Accordingly, what is desired is a method of making inexpensive housing components that use fiberglass and concrete but does not use steel in any form. A method is desired that is a total structural housing part system. A method is desired that uses a single layer rigid fiberglass form potentially well-suited for a compressed earth brick (CEB) bungalow design. Also it is desired that the form be free of iron or wire meshes and be continuous without voids between a top and bottom panel of concrete. It is also desired to provide a method that imparts additional strength and creates a flat surface for a floor or roof for instance, on which a second story for living space or storage can be built. It is further desired that fiberglass resin be used as a form and be able to distort in two directions allowing a concrete shell to handle structural work. A method is desired that will produce a structure that is light and therefore less costly to ship. The method should provide a permanent housing component that is meant to span long distances. The method is further desired that will provide housing components that have internal strength.

BRIEF SUMMARY OF THE INVENTION

A housing component formed of a plurality of single rigid fiberglass arch forms secured in place with a binder such as cement or eco-bricks. The forms are placed parallel to each other and secured on or in an edifice with a temporary shore that receives and retains a binder. The temporary shore is removed once the binder cures.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows a housing component of the present invention, the housing component shown in FIG. 1 is a roof system disposed on an edifice.

2

FIG. 2 is a side view of the roof system in FIG. 1.

FIG. 3 shows one housing component form as shown in FIG. 1.

FIG. 4 shows a plan view of FIG. 3.

FIGS. 5A and 5B show end views of FIG. 3.

FIG. 6 shows a second embodiment of the housing component of the present invention, the housing component shown in FIG. 6 is a roof system disposed on an edifice.

FIG. 7 is a side view of the roof system in FIG. 6.

FIG. 8 shows one housing component form as shown in FIG. 6.

FIG. 9 shows a plan view of FIG. 6.

FIG. 10 shows an end view of FIG. 6.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows a thin-shelled roof system **100** on an edifice **50**. The roof **100** comprises arched forms **120** and cement, ferro-cement or concrete **110**. Forms **120** are placed parallel to each other on the edifice **50** and once in place cement **110** is poured on top and contained on top with a temporary perimeter that is removed once set. The form **120** may comprise a fiberglass concrete form that remains in place once the concrete **110** cures. See FIG. 2. The form **120** thus can become an integral part of the thin-shelled roof system. The form itself can take the shape of a trapezoid as shown in FIGS. 3 and 4.

Looking now to FIGS. 3-5B the form **120** is shown to have ends **122** and **124** and fins **126**. End **122** is narrower than end **124**. The fins **127** may be trapezoid shaped but could be any other shape as well. With a trapezoid shaped fin the form **120** deforms in two planes this gives the roof strength and also allow the components to fit together. The distorted configuration of the form **120** may also allow the roof **100** to be strong and avoid the need for any reinforcement components such as reinforcing bar (rebars) of metal mesh. Form **120** may have any dimension in one embodiment the form may be about 548 cm long, 96.8 cm at end **122** and 127.3 cm at end **124**. Form **120** can support a live load of 244 kilograms per square meter (50 PSF).

FIGS. 6-10 shows a thin-shelled roof system **200** that is another embodiment of system **100**. FIG. 6 shows system **200** comprising forms **220** and cement, ferro-cement or concrete **110**. The forms **220** are placed next to each other on edifice **50** and, like system **100**, cement **110** is poured on top and contained on top with a temporary perimeter that is removed once set. Here too the form **220** may comprise a fiberglass concrete form that remains in place once the concrete **110** cures. Form **220** employ domes **220** that are either symmetrical **242** or asymmetrical **244**. The irregularity increases the deformation in two planes increasing strength. The ends **230** of the form **220** are uniform as they have the same dimension. Forms **220** can span 265 CM (12') with an overhang for a total of 549 cm (18') and support a live load of 244 kilograms per square meter (50 PSF).

As mentioned above, systems **100**, **200** provide fiberglass-resin forms that once secured are made permanent by pouring cement **110** on the forms **120**, **220** on site. Temporary shoring is required as the cement **110** cures. The forms **120**, **220** are stackable and interlocking and can be packed in a container for shipping. Each form **120**, **220** is a single rigid layer of fiberglass per arch. In an alternative embodiment, instead of using cement **110** eco-bricks (ecbs) may be used as filler material. The above-described systems **100**, **200** may equally be used to form other housing components such as a floor or walls.

While the present invention has been described in conjunction with specific embodiments, those of normal skill in the art will appreciate the modifications and variations can be made without departing from the scope and the spirit of the present invention. Such modifications and variations are envisioned to be within the scope of the appended claims.

The invention claimed is:

- 1. A housing component system comprising:
 - a plurality of single rigid fiberglass forms having protrusions, said protrusions deforming each said form in two planes, said forms being trapezoidal in shape;
 - a binder, wherein the forms are placed parallel to each other and secured on an edifice with a temporary shore to receive said binder on said forms and within said temporary shore wherein said fins are said protrusions that deform said form in two planes, said fins being trapezoidal in shape.
- 2. The system of claim 1 wherein the forms are arched.
- 3. The system of claim 1 wherein the forms have domes.
- 4. The system of claim 1 wherein the binder is cement.

- 5. The system of claim 1 wherein the housing components form a floor.
- 6. The system of claim 1 wherein the housing components form a wall.
- 7. A roof system comprising:
 - a plurality of single rigid fiberglass arch forms having protrusions, said protrusions deforming each said form in two planes, each form being trapezoidal in shape;
 - a binder, wherein the forms are placed parallel to each other and secured on an edifice with a temporary shore to receive said binder on said forms and within said temporary shore wherein said fins are said protrusions that deform said form in two planes, said fins being trapezoidal in shape.
- 8. The system of claim 7 wherein the forms have domes, wherein said domes are said protrusions that deform said form in two planes.
- 9. The system of claim 7 wherein the binder is cement.

* * * * *