



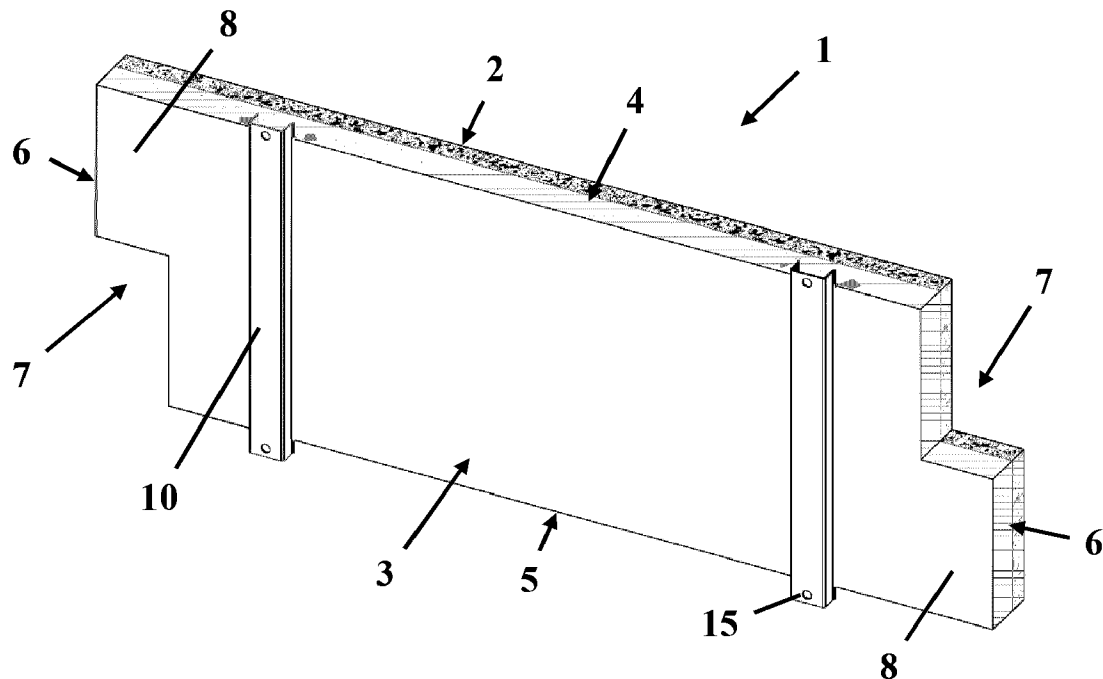
(12) **DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION**

(13) **A1**

(22) Date de dépôt/Filing Date: 2020/11/04
(41) Mise à la disp. pub./Open to Public Insp.: 2021/05/29
(30) Priorité/Priority: 2019/11/29 (US62/941,991)

(51) Cl.Int./Int.Cl. *E04F 13/24* (2006.01),
E04F 13/14 (2006.01), *E04F 13/26* (2006.01)
(71) Demandeur/Applicant:
QUADROSERA CORPORATION, CA
(72) Inventeur/Inventor:
HUFF, ROBERT, CA
(74) Agent: SISKINDS LLP

(54) Titre : PINCE POUR SYSTEME DE PAROI DE PIERRE ARTIFICIELLE
(54) Title: CLIP FOR CAST STONE WALL SYSTEM



(57) **Abrégé/Abstract:**

A tenon clip for affixing cast stone elements to a supporting wall surface having a U-shaped fastening portion with a first fastening side and opposing sidewalls generally perpendicular to the first fastening side. An anchoring flange extends from each of the sidewalls. The first fastening side has a fastening aperture therethrough for fastening the tenon clip to the supporting wall surface. Each anchoring flange has one or more anchors to secure the tenon clip within the cast stone element.

ABSTRACT

5 A tenon clip for affixing cast stone elements to a supporting wall surface having a U-shaped fastening portion with a first fastening side and opposing sidewalls generally perpendicular to the first fastening side. An anchoring flange extends from each of the sidewalls. The first fastening side has a fastening aperture therethrough for fastening the tenon clip to the supporting wall surface. Each anchoring flange has one or more anchors to secure the tenon clip within the cast stone element.

CLIP FOR CAST STONE WALL SYSTEM

Field of the Invention

The present invention relates to cast stone decorative wall systems and to specialized
5 tenon clips for fastening the cast stone elements to a load supporting wall or structure.

Background

Thin stone wall cladding products are available in the marketplace. When installed, an
attractive natural stone appearance is presented. However, commercialization of this decorative
10 wall facing option is slow in acceptance in part because of an inability to easily and inexpensively
attach the facing stone elements to a vertical wall structure.

Typically in the art, thin stone wall systems are installed by the so-called “lick and stick”
method, which involves the use of epoxy adhesive to secure the thin stone or thin brick to plywood
or OSB wall cladding, which involves the use of metal lath with a scratch coat of Portland mortar.
15 Such an adhered thin stone system is inherently less secure since improper application of the
adhesive can lead to stones separating from the wall, which is both a nuisance and a safety problem.
Such adhered thin stone systems are typically only used in lower floor applications of residential
and commercial buildings as there is a bias against their use on multi-floor buildings. Further, the
adhered thin stone system is not used in conjunction with other wall elements such as drainage
20 board and weather-resistant wrap. Accordingly, thin stone products have in the main been used
primarily in commercial building applications.

Various bracket or clip systems have been developed to affix decorative veneer panels made to look like stone to a vertical structural wall. Although useful in particular cases, such systems lack versatility and simplicity, requiring brackets or clips with complicated structures and/or several separate components. Such brackets or clips are difficult to secure to structural walls and require time-consuming alignment of panels.

There remains a need in the art for a more versatile, secure, and mechanically stronger thin stone wall system that is less costly, easier and faster to install and requires less skilled labor.

Summary of the Invention

A tenon clip for affixing cast stone elements to a supporting wall surface, according to the present invention, has a U-shaped fastening portion with a first fastening side and opposing sidewalls generally perpendicular to the first fastening side. An anchoring flange extends from each of the sidewalls. The first fastening side has a fastening aperture therethrough for fastening the tenon clip to the supporting wall surface. Each anchoring flange has one or more anchors to secure the tenon clip within the cast stone element.

In another embodiment, the one or more anchors comprises one or more apertures through the anchoring flanges.

In another embodiment, the one or more anchors comprises a tab extending generally perpendicularly from the anchoring flanges.

In another embodiment, the tenon clip has a length and the cast stone element has a height separating opposing top and bottom edges. The length of the tenon clip is greater than the height of the cast stone element.

5 In another embodiment, the fastening aperture is located adjacent one end of the first fastening side. A second fastening aperture is located adjacent the opposite end of the first fastening side.

In another embodiment, the length of the anchoring flanges is substantially equal to the height of the cast stone element and the tabs are positioned at the top and bottom edges of the cast stone element.

10 A cast stone wall system, according to the present invention, has a supporting wall surface, a cast stone element having a decorative face, a rear face opposite the decorative face, a top edge, and a bottom edge, and a tenon clip having a U-shaped fastening portion with a first fastening side and opposing sidewalls generally perpendicular to the first fastening side. An anchoring flange extends from each of the sidewalls and is at least partially embedded in the rear
15 face of the cast stone element. The first fastening side has a fastening aperture therethrough for fastening the tenon clip to the supporting wall surface. Each anchoring flange has one or more anchors to secure the tenon clip within the cast stone element.

Brief Description of the Drawings

20 In order that the invention may be more clearly understood, embodiments thereof will now be described in detail by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective rear view of a cast stone element with embedded tenon clips, according to the present invention.

Figure 2 is a top view of the cast stone element of Fig. 1.

Figure 3 is a rear view of the cast stone element of Fig. 1.

5 Figure 4 is a rear view of a number of cast stone elements with embedded tenon clips of a cast stone wall system, according to the present invention.

Figure 5 is a cross-sectional view of the cast stone wall system of Fig. 4, along the lines A-A in Figure 4.

10 Figure 6 is a cross-sectional view of the cast stone element of Fig. 1, along the lines C-C in Figure 3.

Figure 7 is a perspective view of a tenon clip, according to the present invention.

Figure 8 is a front view of the tenon clip of Fig. 7.

Figure 9 is a side view of the tenon clip of Fig. 7.

Figure 10 is a top view of the tenon clip of Fig. 7.

15

Detailed Description of the Invention

The tenon clip and cast stone wall system, according to the present invention provide an aesthetically pleasing stone wall appearance with ease of installation. The cast stone elements may be affixed to a supporting wall surface by means of the tenon clip, which provides a convenient

means of attachment and spacing between the cast stone elements and the supporting wall to allow for drainage. The tenon clips are inserted into the cast stone, during the casting process while the material is wet, thereby embedding the tenon clip within the cast stone element. A single tenon clip may be used, which spans the height of the cast stone element and extends past the top and bottom edges, or two tenon clips may be used, which are positioned opposite one another at the top and bottom edges of the cast stone element.

As shown in Figures 1-3, a cast stone element **1** has a front decorative face **2**, rear face **3**, top edge **4**, and bottom edge **5**. The cast stone element is formed by pouring wet casting material, such as concrete, into a mold. In some embodiments, the front decorative face **2** is made up of a layer of natural stone, which is set in the mold prior to pouring wet casting material into the mold. In one exemplary embodiment, the cast stone element **1** has a height of 215 mm, a length of 620 mm, and a thickness of 40 mm, with two tenon clips **10** positioned along the length of the cast stone element **1** about 123 mm from either end **6**. The ends **6** of the cast stone element **1** may be shaped to overlap with adjacent cast stone elements **1**. As shown in Fig. 3, each end **6** has a cut-out **7** at the top or bottom edge **4** or **5**, shaped complementary to a tab **8** at the other end **6**. Alternatively, the ends **6** may be flat or have another convenient shape to facilitate engaging adjacent cast stone elements **1** to cover a supporting wall surface.

A tenon clip **10**, as shown in Figures 7-10, is used for attaching the cast stone elements **1** to plywood, drainage board, or other supporting wall structure. By inserting the tenon clip **10** into the cast stone element **1** during casting, the tenon clip **10** is securely retained therein. The tenon clip **10** has a generally U-shaped fastening portion **11** with a first fastening side **12** and two opposing sidewalls **13**. The sidewalls **13** are connected to the first fastening side **12** at the corners

of the U-shape and generally perpendicular to the first fastening side **12**. An anchoring flange **14** extends from each of the sidewalls **13** and is at least partially embedded in the rear face **3** of the cast stone element **1**, as shown in Fig. 6. Preferably, the anchoring flanges **14** are entirely or substantially embedded within the cast stone element **1**, while the fastening portion **11** of the tenon clip **10** extends outwardly from the rear face **3** of the cast stone element **1** to provide spacing between the rear face **3** of the cast stone element **1** and the supporting wall surface. Preferably, the anchoring flanges **14** are embedded in the cast stone element **1** when the concrete or other material of the cast stone element **1** is in a wet state, prior to curing. Alternatively, the anchoring flanges **14** may be inserted into angle grooves or kerfs cut into the rear face **3** of the cast stone element **1**. The first fastening side **12** has a fastening aperture **15** therethrough for fastening the tenon clip **10** to the supporting wall surface, thereby securing the cast stone element **1** to the supporting wall surface.

The anchoring flanges **14** have one or more anchors to improve the pull-out strength and help secure the tenon clip **10** within the cast stone element **1**. As shown in Figs. 6-9, the anchors may be apertures **16** through the anchoring flanges **14** that permit the material of the cast stone element **1** to flow through the anchoring flanges **14** to secure the tenon clip **10** and prevent it from moving or slipping relative to the cast stone element **1**. Additionally, tabs **17** may be provided extending perpendicularly from the anchoring flanges **14**, parallel to the top and bottom edges **4** and **5** of the cast stone element **1**. Preferably, as shown in Figs. 3 and 6, the tabs **17** are positioned at or just beneath the top or bottom edges **4** or **5** of the cast stone element **1**, but other configurations of tabs may be used in addition to or in place of apertures **16** or other types of anchors to secure the anchoring flanges **14** within the cast stone element **1**. Preferably, the tenon clip **10** is configured such that it can be made by bending and cutting a single piece of metal.

As shown in Fig. 3, the length of the tenon clip **10** is slightly longer than the height of the cast stone element **1**, such that the fastening apertures **15** near the ends of the tenon clip **10** are positioned above or below the top or bottom edges **4** or **5** of the cast stone element **1**. This permits a fastener to be driven through the fastening aperture **15** into the supporting wall surface with the cast stone element **1** in position against the supporting wall surface and any adjacent cast stone elements **1**. As shown in Figs. 4 and 5, each successive row of cast stone elements **1** in a cast stone wall system, using the cast stone elements **1** and tenon clips **10** of the present invention, may be positioned resting directly on top of the row below with substantially no space therebetween. The fastening portion **11** of the tenon clip **10** which extends above and below the top and bottom edges **4** and **5** of the cast stone element **1** slides into the space between the rear face **3** of the cast stone element **1** below and the supporting wall surface.

Alternatively, the tenon clip **10** may be shorter than the height of the cast stone element **1**. A tenon clip **10** may be positioned at the top edge **4** and another at the bottom edge **5** of the cast stone element **1**. The shorter tenon clips **10** may be configured the same as the longer tenon clips **10**, which span the entire height of the cast stone element **1**, except that they, preferably, do not have tabs **17** at both ends and the fastening portion **11** does not extend beyond the anchoring flanges **14** at both ends. In this embodiment, tabs **17** are positioned substantially at the top or bottom edge **4** or **5** of the cast stone element **1**, the fastening portion **11** of the tenon clip **10** extends beyond the same top or bottom edge **4** or **5**, and the tenon clip **10** extends towards the other top or bottom edge **4** or **5** by a distance less than the height of the cast stone element **1**.

A starter strip may be used to support the bottom row of cast stone elements **1** from below, from above, or from one side. The starter strip has a support flange and a base flange

extending from the support flange, preferably, at a right angle. The support flange has one or more apertures for receiving fasteners to attach the starter strip to the supporting wall surface. The base flange may have one or more drainage apertures for permitting moisture to escape from between the cast stone elements **1** and the supporting wall surface. The starter strip has a length long enough
5 to span two or more cast stone elements **1** and, preferably, between about 3' to 12', more preferably, between 4' and 8'.

The starter strip may be straight or curved and may have an L-shaped or J-shaped cross section. Where the tenon clip **10** extends beyond both the top and bottom edges **4** and **5** of the cast stone element **1**, a J-shaped starter strip may be used to accommodate the tenon clip **10** extending
10 below the bottom edge **5** of the cast stone element **1**. Curved starter strips may be used to span archways, windows, and the like.

Optionally, the tenon clip **10** may be shimmed with reference to the supporting wall surface to leave space between the supporting wall surface and the first fastening side **12** of the tenon clip **10**. In this way the spacing between the cast stone element **1** and the supporting wall
15 surface may be selectively adjusted, as required, for example, to accommodate any uneven areas on the supporting wall surface. A shim feature may be provided at the rear of the tenon clip **10**, such as a raised flexible indent portion or biasing tab. An installer may incrementally depress the tab to provide the desired spacing.

The vertices of the tenon clip **10**, such as the corners of the U-shaped fastening portion
20 **11** and the point at which the anchoring flanges **14** extend from the sidewalls **13**, may be structurally reinforced to prevent relative bending between the parts of the tenon clip **10**.

Preferably the vertices are structurally reinforced by way of crimps, welds, or channels formed on the vertices of the tenon clip **10**.

A cast stone element **1**, according to the present invention, may be prepared by placing a tenon clip **10** in a mold with the anchoring flanges **14** facing downwardly and at least partially immersed in the wet casting material in the mold. The tenon clip **10** is positioned with the U-shaped fastening portion **11** above the casting material and resting on the top edges of the mold. Several tenon clips **10** may be positioned across the top of the mold, as required. Preferably, two tenon clips **10** are used, located to each side of the mold, as shown in Figs. 1-3. Optionally, the tabs **17** may be used to locate and guide the tenon clip **10** into position in the mold. As the casting material hardens, the tenon clips **10** become securely attached to the cast stone element **1** by means of the anchoring flanges **14** embedded within the rear face **3**. A cast stone element **1** is thereby produced, which may be attached to a supporting wall surface by driving a fastener through the fastening aperture **15** of the tenon clip **10**.

A cast stone wall system, according to the present invention, permits the convenient and secure installation of cast stone elements **1**, with embedded tenon clips **10**, as described herein, on a supporting wall surface to provide a decorative stone finish to the wall, without using adhesives to affix the cast stone elements **1** to the wall.

The present invention has been described and illustrated with reference to an exemplary embodiment, however, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention as set out in the following claims. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed herein.

What is claimed is:

1. A tenon clip for affixing cast stone elements to a supporting wall surface, comprising a U-shaped fastening portion with a first fastening side and opposing sidewalls generally perpendicular
5 to the first fastening side and an anchoring flange extending from each of the sidewalls, wherein the first fastening side has a fastening aperture therethrough for fastening the tenon clip to the supporting wall surface and, wherein each anchoring flange has one or more anchors to secure the tenon clip within the cast stone element.
- 10 2. The tenon clip of claim 1, wherein the one or more anchors comprises one or more apertures through the anchoring flanges.
3. The tenon clip of claim 2, wherein the one or more anchors comprises a tab extending generally perpendicularly from the anchoring flanges.
- 15 4. The tenon clip of claim 3, wherein the tenon clip has a length and the cast stone element has a height separating the opposing top and bottom edges and, wherein the length of the tenon clip is greater than the height of the cast stone element.
- 20 5. The tenon clip of claim 4, wherein the fastening aperture is located adjacent one end of the first fastening side and a second fastening aperture is located adjacent the opposing end of the first fastening side.

6. The tenon clip of claim 5, wherein the anchoring flanges have a length substantially equal to the height of the cast stone element and, wherein the tabs are positioned at the top and bottom edges of the cast stone element.

5 7. A cast stone wall system, comprising:

a supporting wall surface;

a cast stone element having a decorative face, a rear face opposite the decorative face, a top edge, and a bottom edge; and

a tenon clip having a U-shaped fastening portion with a first fastening side and opposing
10 sidewalls generally perpendicular to the first fastening side and an anchoring flange extending from each of the sidewalls and is at least partially embedded in the rear face of the cast stone element, wherein the first fastening side has a fastening aperture therethrough for fastening the tenon clip to the supporting wall surface and, wherein each anchoring flange has one or more anchors to secure the tenon clip within the cast stone element.

15

8. The cast stone wall system of claim 7, wherein the one or more anchors comprises one or more apertures through the anchoring flanges.

9. The cast stone wall system of claim 8, wherein the one or more anchors comprises a tab
20 extending generally perpendicularly from the anchoring flanges.

10. The cast stone wall system of claim 9, wherein the tenon clip has a length and the cast stone element has a height separating the opposing top and bottom edges and, wherein the length of the tenon clip is greater than the height of the cast stone element.

5 11. The cast stone wall system of claim 10, wherein the fastening aperture is located adjacent one end of the first fastening side and a second fastening aperture is located adjacent the opposing end of the first fastening side.

10 12. The cast stone wall system of claim 11, wherein the anchoring flanges have a length substantially equal to the height of the cast stone element and, wherein the tabs are positioned at the top and bottom edges of the cast stone element.

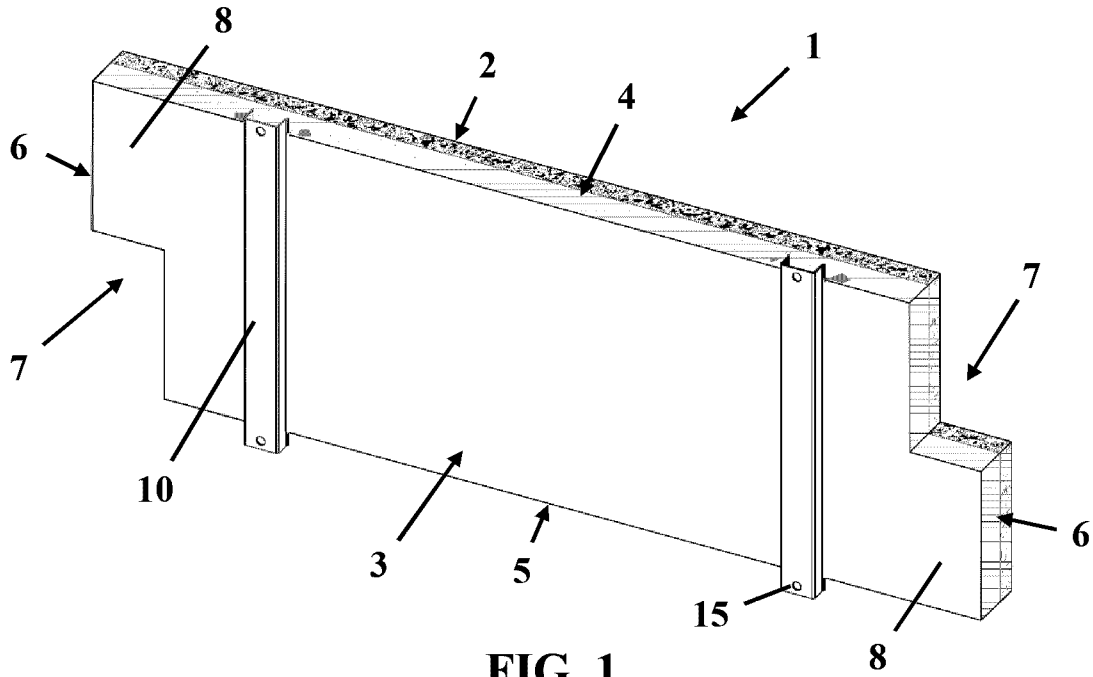


FIG. 1

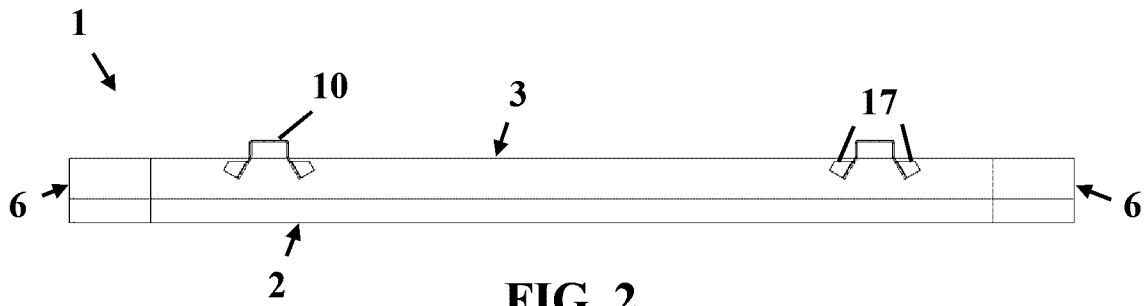


FIG. 2

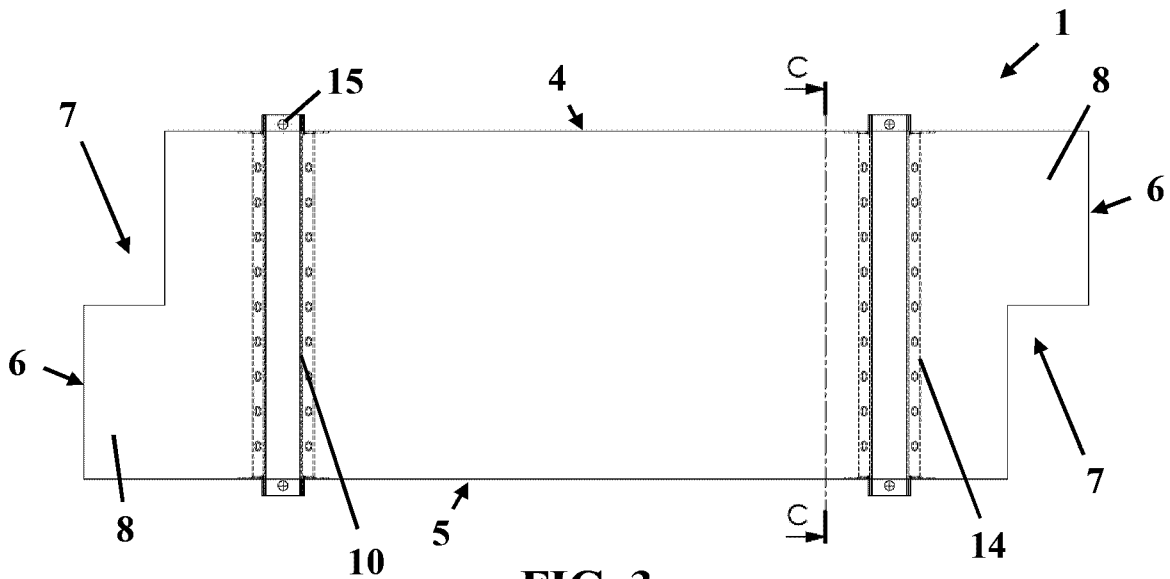


FIG. 3

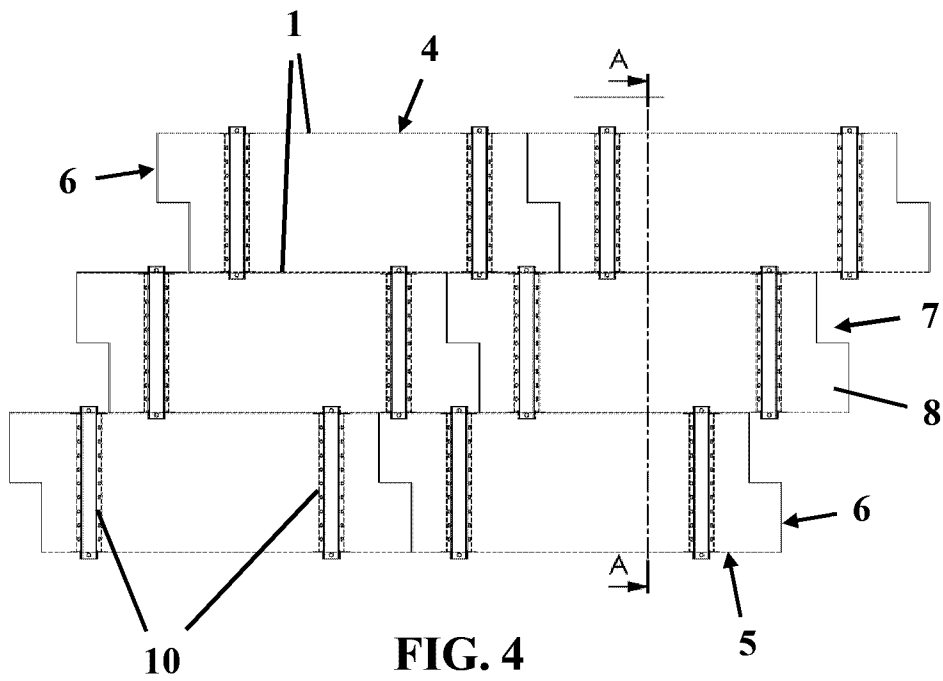


FIG. 4

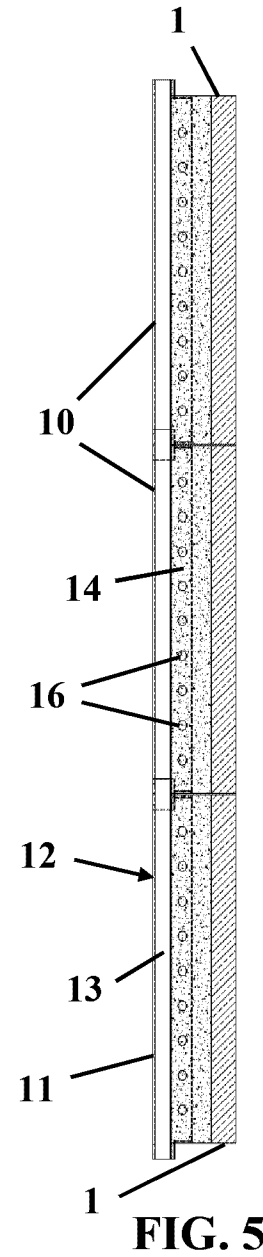


FIG. 5

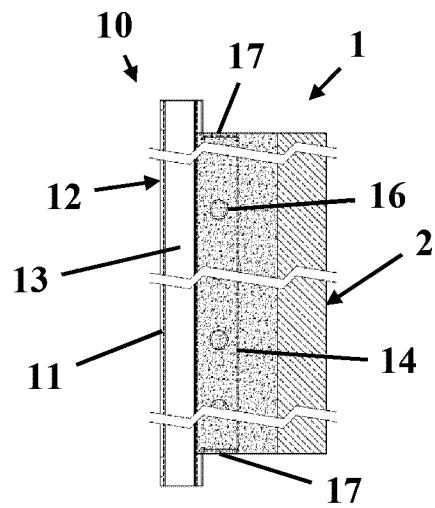


FIG. 6

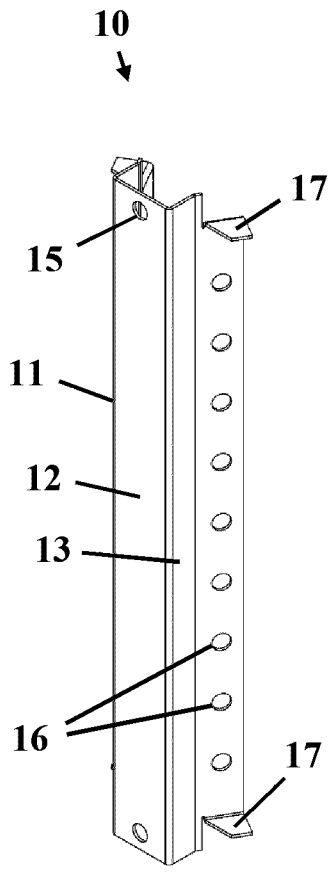


FIG. 7

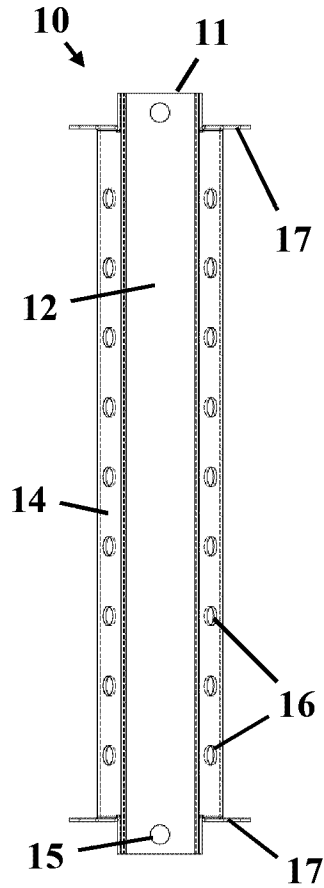


FIG. 8

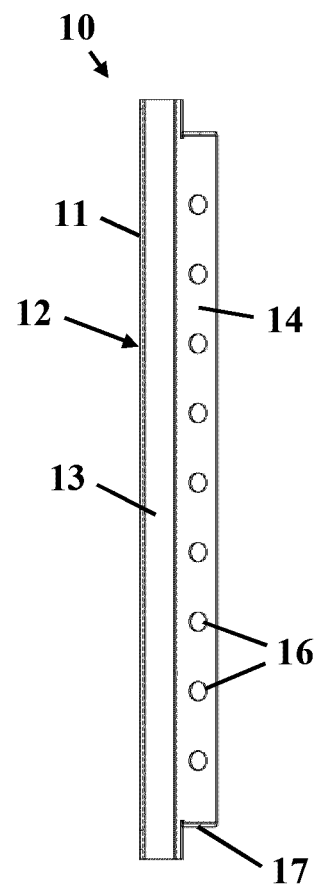


FIG. 9

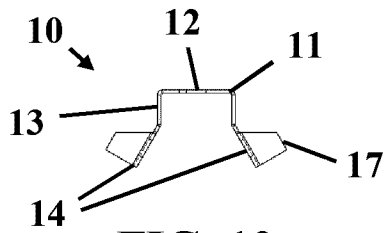


FIG. 10

