US 20100192495A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2010/0192495 A1**

(43) **Pub. Date: Aug. 5, 2010**

Huff et al.

(54) **THIN STONE OR BRICK VENEER WALL SYSTEM AND CLIPS THEREFOR**

(75) Inventors: **Robert Huff**, London (CA); **Mark Shouldice**, Shallow Lake (CA)

Correspondence Address:
Anissimoff & Associates
235 North Centre Road, Suite 201
London, ON N5X 4E7 (CA)

(73) Assignee: **Shouldice Designer Stone Ltd.**, Shallow Lake (CA)

(21) Appl. No.: **12/662,201**

(22) Filed: **Apr. 6, 2010**

Related U.S. Application Data

(63) Continuation of application No. 11/305,289, filed on Dec. 19, 2005.

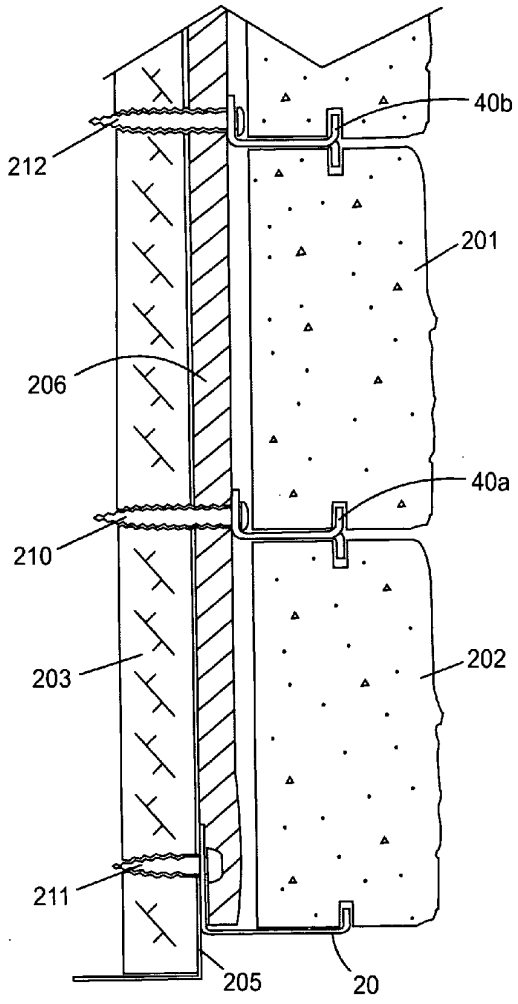
Publication Classification

(51) **Int. Cl.**
E04B 2/32 (2006.01)
E04B 2/34 (2006.01)
E04B 1/70 (2006.01)

(52) **U.S. Cl.** **52/302.1**; 52/489.1; 52/582.1

(57) **ABSTRACT**

A wall system, particularly for thin stone or thin brick veneer walls, has a plurality of stones or bricks with grooves running along the upper and lower edges and a plurality of clips for linking the stones or bricks. One type of clip having one or more connecting flanges links an upper stone or brick to a lower stone or brick with the one or more connecting flanges housed within the groove in the lower edge of the upper stone or brick and within the groove in the upper edge of the lower stone or brick. The one or more connecting flanges of the clip depend from one or more base flanges of the clip and have a width just equal to the distance from the rear face to the groove of the upper and lower stones or bricks. The one or more base flanges of the clip depend from a support flange of the clip. The support flange has one or more apertures for accepting a screw or nail for fastening the clip to a structural wall.



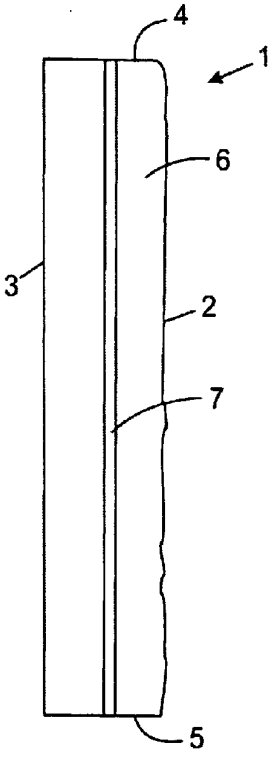


FIG. 1B

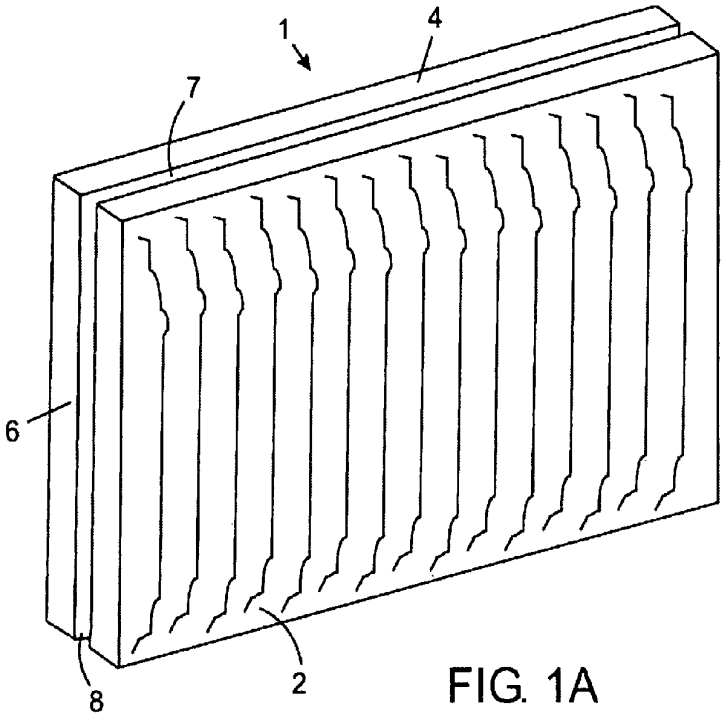


FIG. 1A

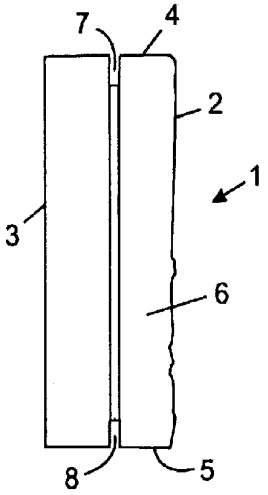


FIG. 1C

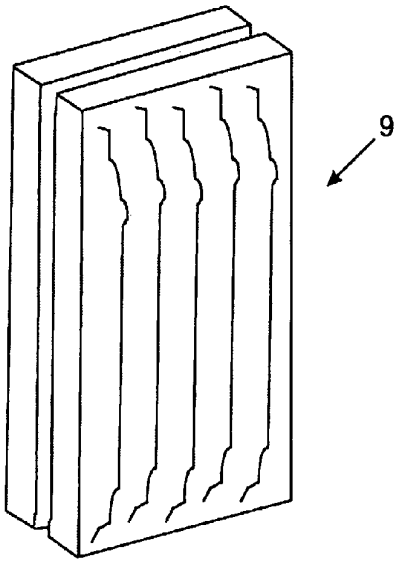


FIG. 1D

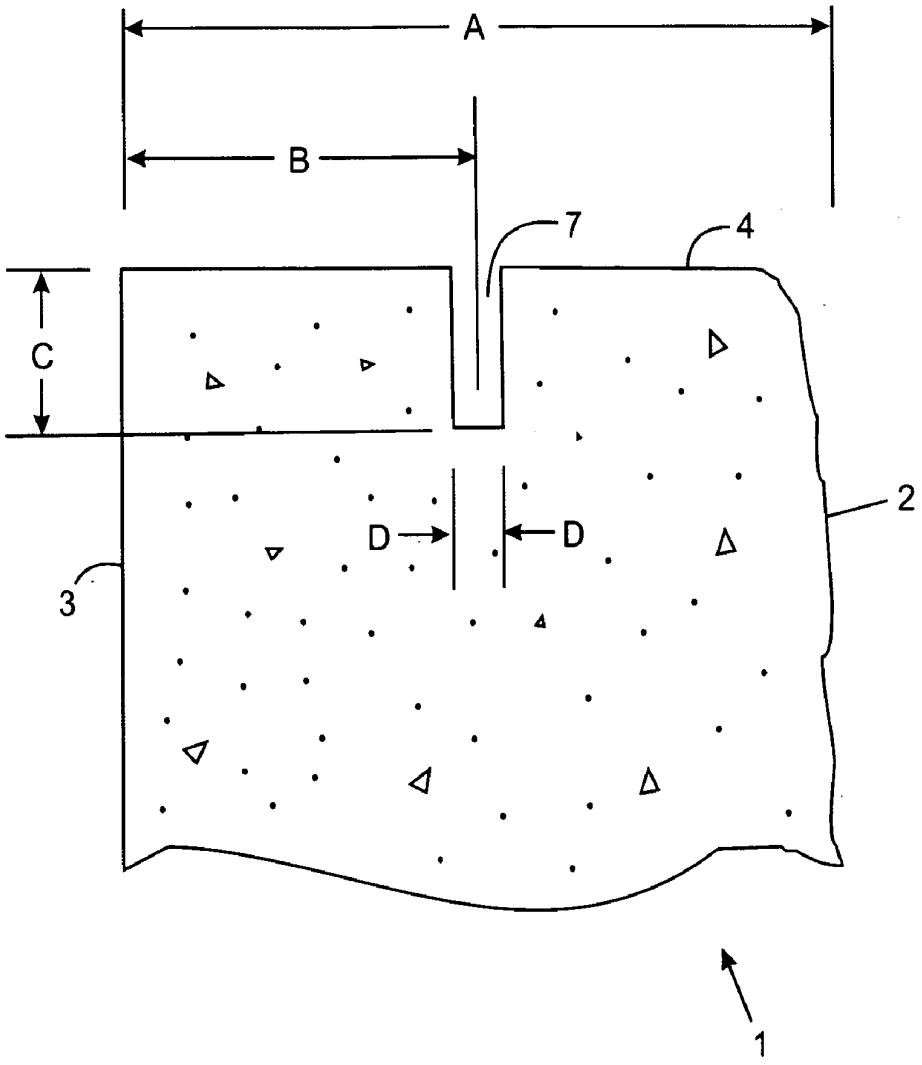


FIG. 1E

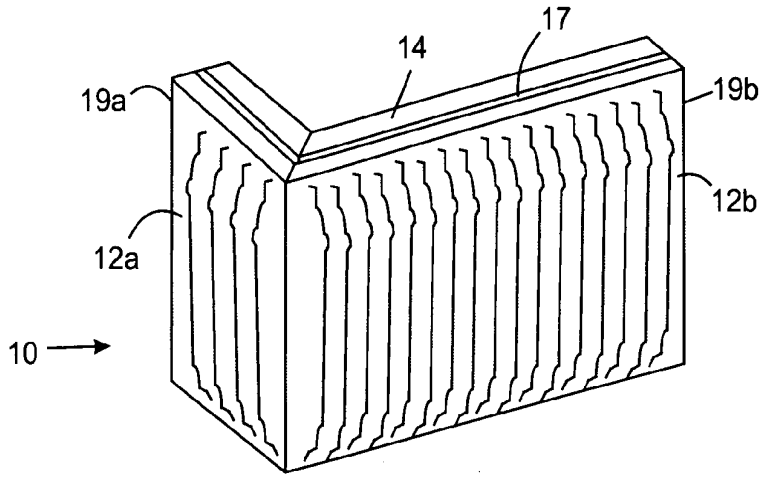


FIG. 2A

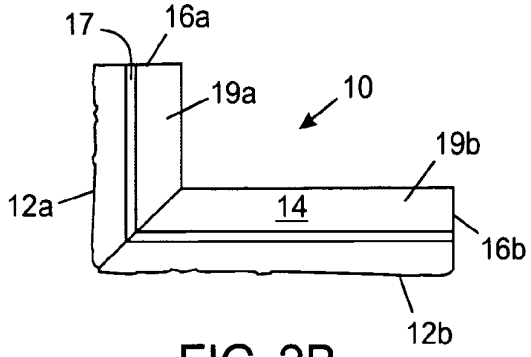


FIG. 2B

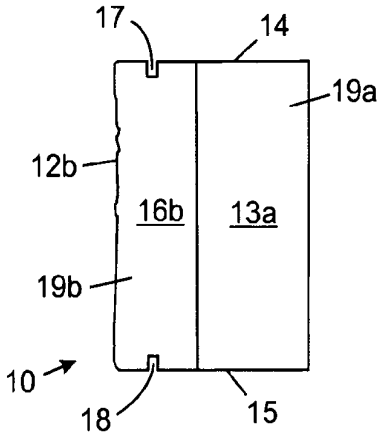


FIG. 2C

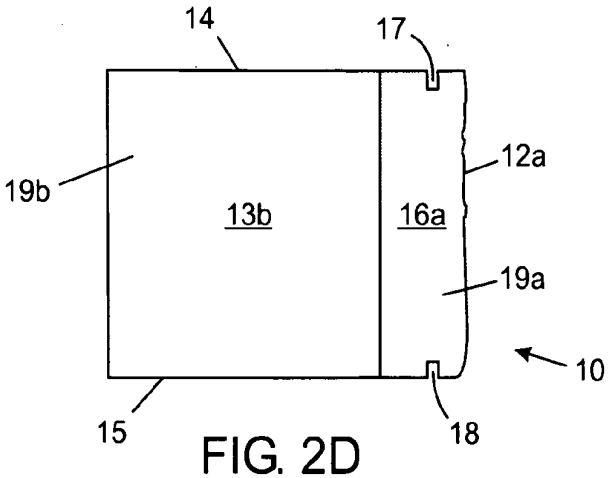


FIG. 2D

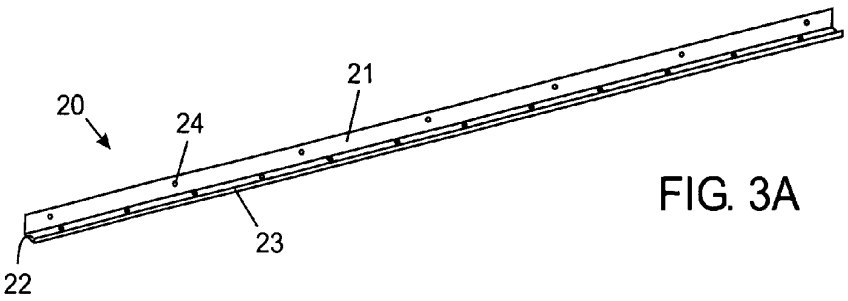


FIG. 3A

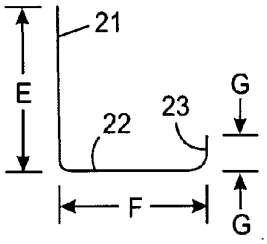


FIG. 3B

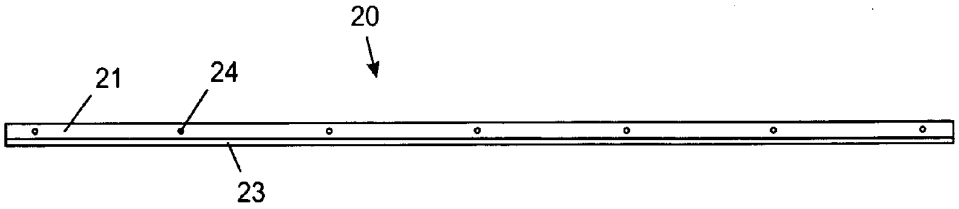


FIG. 3C

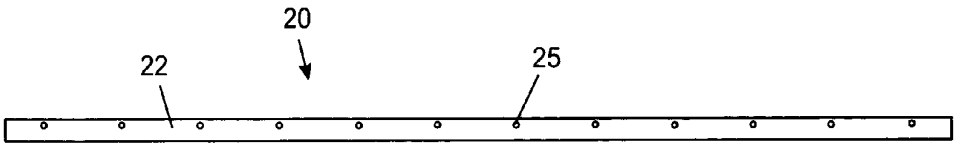


FIG. 3D

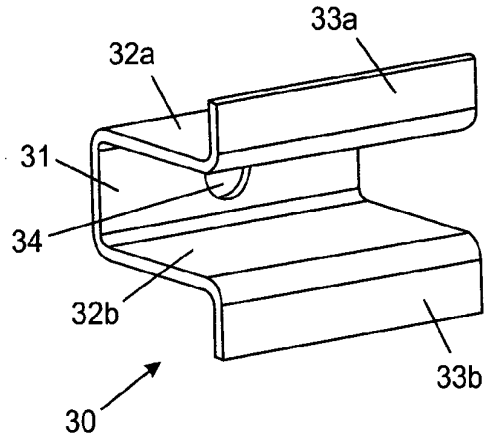


FIG. 4A

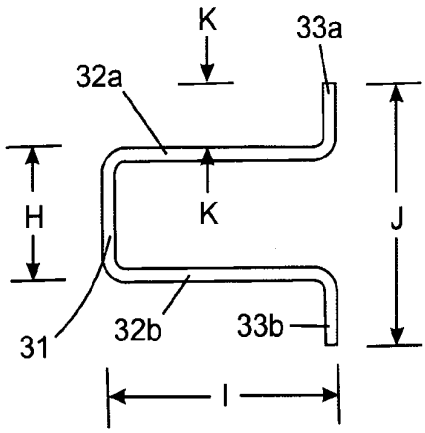


FIG. 4B

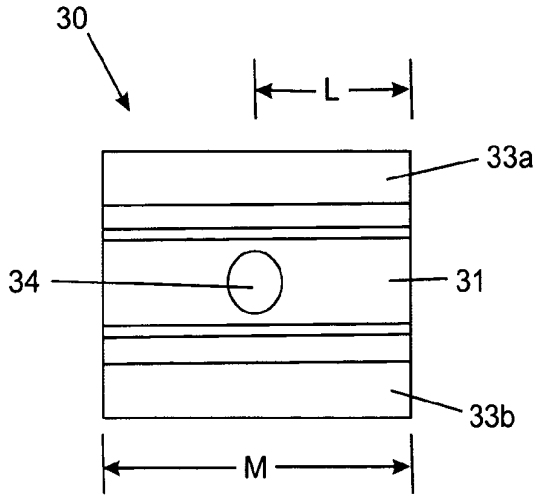


FIG. 4C

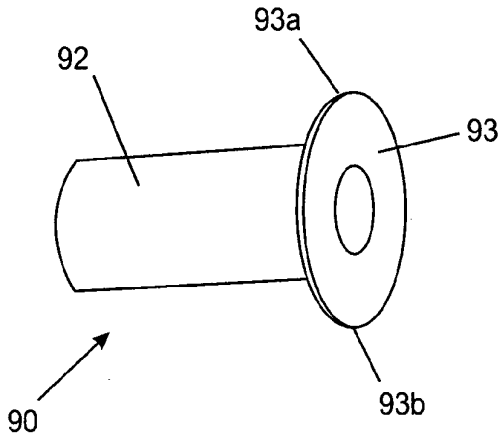


FIG. 5A

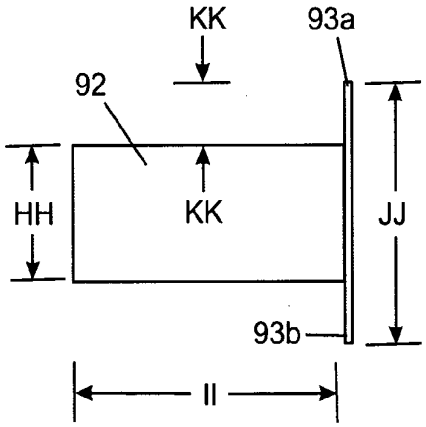


FIG. 5B

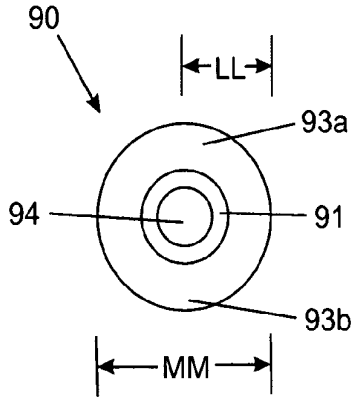


FIG. 5C

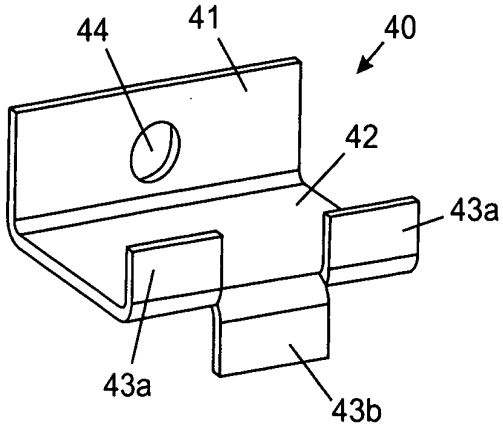


FIG. 6A

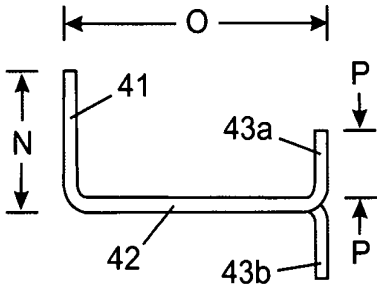


FIG. 6B

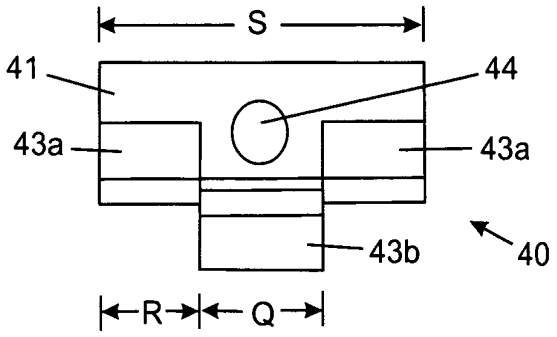


FIG. 6C

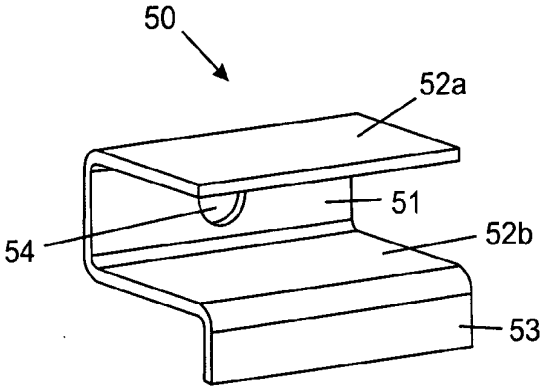


FIG. 7A

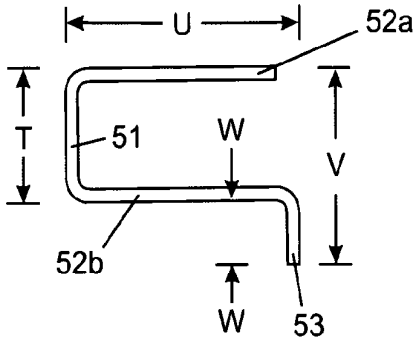


FIG. 7B

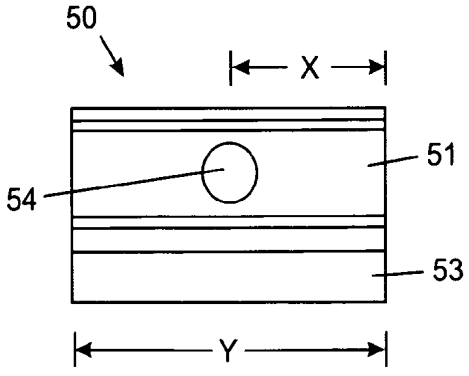


FIG. 7C

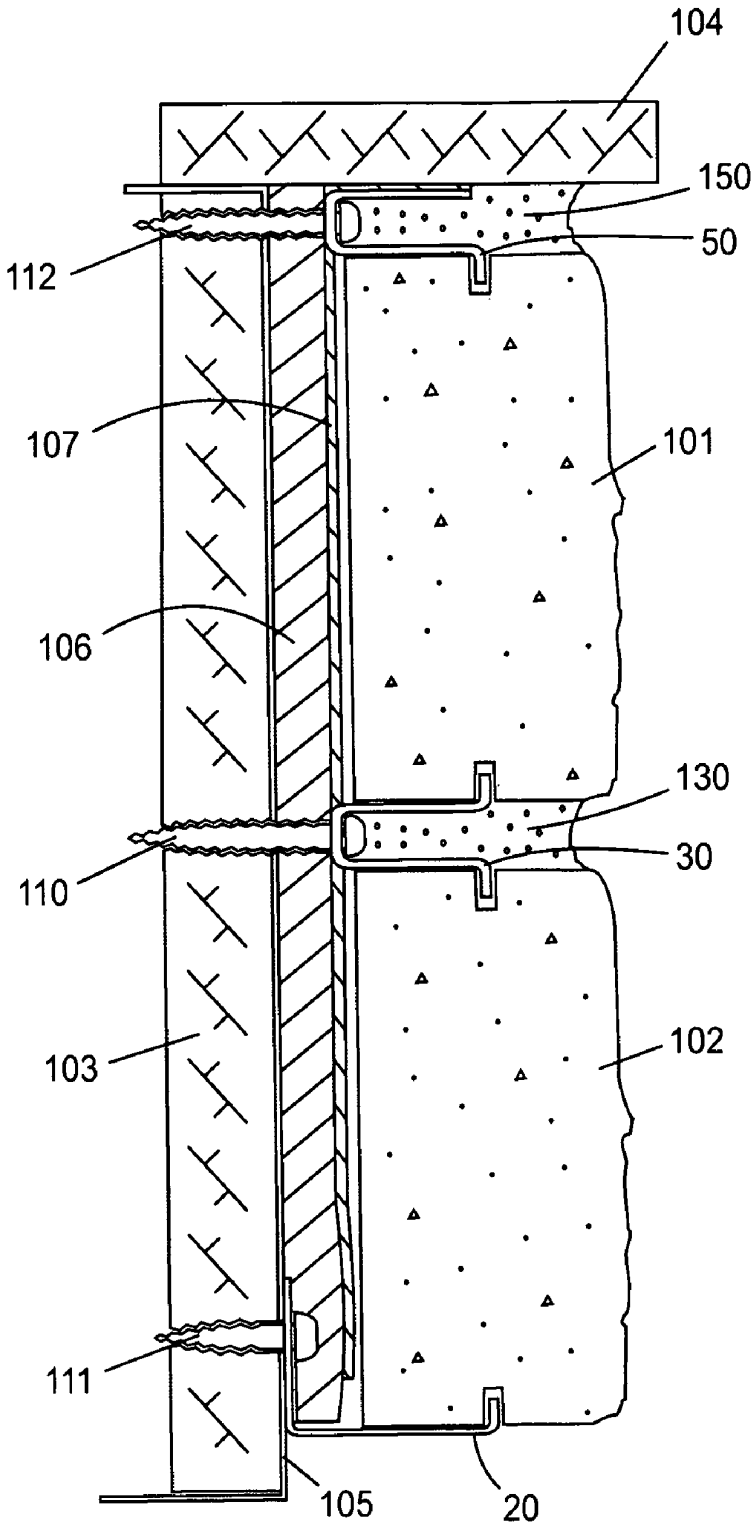


FIG. 8A

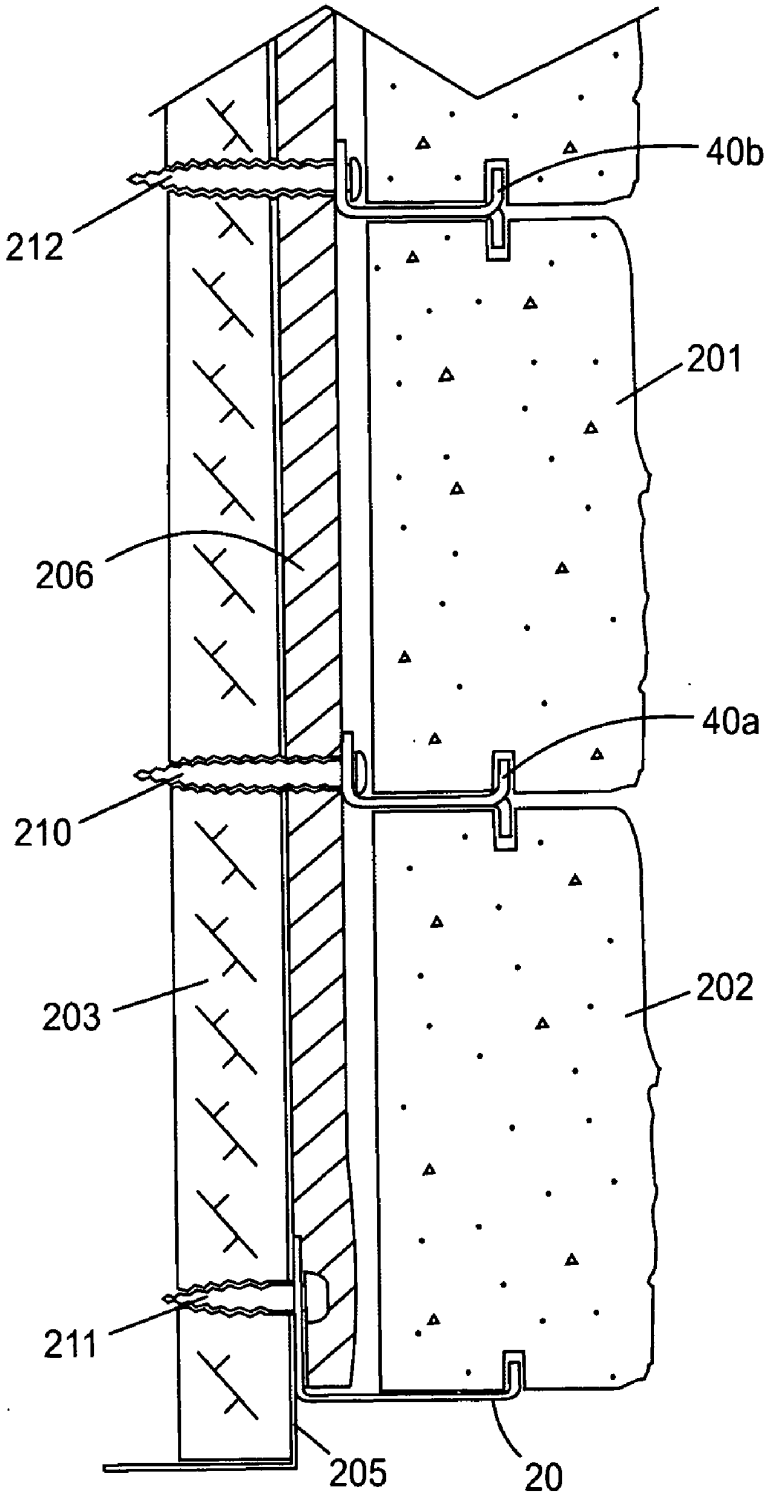


FIG. 8B

THIN STONE OR BRICK VENEER WALL SYSTEM AND CLIPS THEREFOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 11/305,289 filed Dec. 19, 2005, which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to thin stone or thin brick veneer wall systems and to clips for fastening facing elements thereof.

BACKGROUND OF THE INVENTION

[0003] Masonry veneer walls are typically constructed by laying bricks, blocks or other stone product in courses and mortaring the top of each course as the wall is being built from the bottom up. Conventionally, the lower course of bricks, blocks or other stone product is supported on a foundation (e.g. poured concrete) or an engineered angle iron to carry the mass load. Such construction requires a skilled masonry contractor and is very time consuming. Further, since individual bricks, blocks or other stone products are relatively thick and heavy at full depth, such construction is also expensive and leads to veneer walls of great weight.

[0004] To decrease the weight of the veneer wall, stone-like or brick-like products comprising polymeric materials or polymer/cement composites have been developed. Such materials tend to be lighter in weight but lose aesthetic appeal since they do not look sufficiently like brick or natural stone. In addition, such products are more costly and, in most cases, require a specific contractor to install them.

[0005] So-called thin stone or thin brick products have been developed, which are made by splitting cement blocks and then further dressing the front face if desired. Such products have a more natural stone or brick appearance, however, finding ways to easily, inexpensively and quickly construct veneer walls using such thin stones or thin bricks has been problematic. Typically in the art, thin stone or thin brick veneer walls are constructed 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 cladding, or which involves the use of metal lath with a scratch coat of Portland mortar. Such an adhered thin stone or thin brick system is inherently less secure since improper application of the adhesive can lead to stones or bricks separating from the wall, which is both a nuisance and a safety problem. Such adhered thin stone or thin brick systems are typically only used in lower floor applications of residential and commercial buildings. Design professionals hesitate to use them on multi-floor buildings. Further, the adhered thin stone or thin brick system has not, in the past, been used in conjunction with other wall elements such as drainage board and weather-resistant wrap, thus thin stone or thin brick products have been preponderantly used in commercial building applications.

[0006] Various bracket or clip systems have been developed to affix veneer panels of various sorts to a 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 more difficult to secure to structural walls and/or require tedious and time-consuming alignment of panels. There remains a need in the art for a more versatile, secure and mechanically stronger thin stone or thin brick veneer wall system that is easier and faster to install requiring less skilled labor.

SUMMARY OF THE INVENTION

[0007] There is provided a thin stone or thin brick wall system comprising: a plurality of stone or brick facing elements, each facing element having a weight, a thickness, an upper edge and a lower edge, the upper edge, the lower edge or both the upper and lower edges of each facing element having a groove running along the edge at a distance from a rear face of the facing element, the groove having a length, a width and a depth; and, a plurality of clips for linking the facing elements, the plurality of clips comprising one or more first clips for linking upper facing elements to lower facing elements, each of the first clips having one or more connecting flanges housed within the groove in the lower edge of one of the upper facing elements and within the groove in the upper edge of one of the lower facing elements, the one or more connecting flanges of the first clip depending from one or more base flanges of the first clip, the one or more base flanges of the first clip depending from a support flange of the first clip, the support flange having one or more apertures for accepting fastening means for fastening the first clip to a structural wall, and the one or more base flanges having a width just equal to the distance from the rear face to the groove of the upper and lower facing elements.

[0008] There is further provided a clip for linking first and second stone or brick facing elements in a thin stone or thin brick wall system, each facing element having a weight, a thickness, an upper edge and a lower edge, the first facing element having a groove in the lower edge thereof, the second facing element having a groove in the upper edge thereof, each groove running along its respective edge at a distance from a rear face of its respective facing element, each groove having a length, a width and a depth, the clip comprising: one or more connecting flanges housable within the groove in the lower edge of the first facing element and within the groove in the upper edge of one of the second facing elements; the one or more connecting flanges depending at right angles from one or more base flanges; the one or more base flanges depending at right angles from a support flange, the support flange having one or more apertures for accepting fastening means for fastening the clip to a structural wall; and, the one or more base flanges having a width just equal to the distance from the rear face to the groove of each facing element.

[0009] There is yet further provided a sill clip for retaining detail pieces of a thin stone or thin brick wall system, each detail piece being a thin stone or thin brick facing element, the facing element having a thickness and an edge, the edge having a groove therein running along the edge at a distance from a rear face of the facing element, the groove having a length, a width and a depth, the sill clip comprising: a connecting flange that is housable within the groove in the edge of the facing elements; the connecting flange depending at a right angle from a first base flange; the first base flange depending at a right angle from a support flange, the support flange oriented upwardly; the support flange having one or more apertures for accepting fastening means for fastening the sill clip to a structural wall; and, the first base flange having a width just equal to the distance from the rear face to the groove of the facing element.

[0010] There is still yet further provided a starter strip for supporting stone or brick facing elements in a thin stone or thin brick wall system, each facing element having a weight, a thickness and an edge, the edge having a groove therein running along the edge at a distance from a rear face of the facing elements, the groove having a length, a width and a depth, the starter strip comprising: a linking flange that is housed within the groove in the edge of one or more of the facing elements; the linking flange depending from a base flange; the base flange depending from a support flange; the support flange having one or more apertures for accepting fastening means for fastening the starter strip to a structural wall; the base flange having a width greater than the distance from the rear faces to the grooves of the facing elements; and, the starter strip having a length long enough to span two or more adjacent facing elements.

[0011] The wall system of the present invention, including the clips therefor, is useful in constructing so-called "thin stone" or "thin brick" veneer walls. Thin brick and thin stone differs from regular brick or stone cladding by virtue of the way in which the facing element is manufactured and by virtue of the size and weight of the facing element. Thin stone or thin brick may be manufactured by splitting concrete blocks and, if desired, further dressing the outer face of the stone. Thin brick may also be manufactured by molding clay into brick-shaped objects and firing the clay for hardness. Thin stone or thin brick is about 1.25 inches thick and building codes require thin stone or thin brick to be not heavier than 15 pounds per square foot, as opposed to regular stone which is typically 3.5 inches thick and may be heavier than 15 pounds per square foot. The code for thin stone arises primarily from prior art adhered thin stone cladding systems in which the stone is affixed to a building by an epoxy adhesive or with metal lath and a scratch coat of mortar (the so-called "lick & stick" method).

[0012] The wall system of the present invention advantageously provides a more versatile, secure and mechanically stronger veneer wall than has been previously realized in the art for thin stone or thin brick. Facing elements are easier and faster to install than in previous systems, and require less skilled labor thereby permitting general tradesman and even the average building owner to erect a thin stone or thin brick veneer wall.

[0013] Further, the present wall system advantageously permits mounting of facing elements on any variety of structural walls (e.g. wood studs, steel studs and concrete), and may actually increase the strength of a stud wall, rather than decrease it as is the case with prior art systems. Additionally, the present system permits excellent water management and ventilation between the veneer and the structural wall.

[0014] Yet further, the present wall system advantageously permits construction of thin stone or thin brick veneer walls having virtually any kind of appearance. For example, construction of random bond veneer walls having random size coursing by mixing different heights and lengths of stone or brick, or single size coursing with stones or bricks of the same height and length are both possible using the same wall system. It is also possible to do big dimensional stone units without sacrificing strength or appearance. Either a mortar joint wall or a mortarless wall, or even a mixture of both, may constructed using the present wall system. Pre-prepared corner facing elements are easily incorporated into the present wall system and may be used to provide a full Bed-Depth stone appearance at the corners.

[0015] In a wall system of the present invention, facing elements preferably have grooves formed and/or cut into both the upper and lower edges. The grooves preferably run along the edges at a fixed distance from the rear face of the facing element. Preferably, the grooves run along the entire length of the upper and lower edges. The facing elements may also have grooves formed and/or cut into one or both, preferably both, side edges. The grooves in the side edges preferably have the same depth and width as those in the upper and lower edges, and are preferably the same distance from the rear face. In a particularly preferred embodiment, there is one continuous groove running along the edges around the perimeter of the facing element.

[0016] Two types of facing elements may be defined depending on their location in the wall. A first type is used in the middle of the wall and the second type is a corner element. The first type of facing element is generally of a panel type construction having a rear face, a front (outer) face, upper and lower edges and side edges. The front face is a surface that presents in one direction only.

[0017] Corner elements (the second type of facing element) have a rear face, a front (outer) face, upper and lower edges and side edges as well, but they generally have complicated profiles so that the front face presents in two or more directions. Corner elements are preferably one-piece constructions having parts held together by connecting pins, the pins preferably set in an adhesive, e.g. an epoxy adhesive. The pins are preferably steel pins, more preferably stainless steel or galvanized steel, even more preferably stainless steel. Such corner elements permit the use of standard sized stones or bricks while maintaining a clean appearance at corners. In one example, the corner element is generally L-shaped comprising a first part attached to a second part. The outer face of the first part is longer than and at a right angle to the outer face of the second part. A plurality of such corner elements may be vertically overlapped alternating the directions of the first and second parts to provide a veneer wall with a clean looking corner having a full Bed-Depth appearance.

[0018] In forming a veneer wall, a plurality of facing elements are mounted on a structural wall and arranged next to each other in a desired pattern. In order to mount the facing elements on the structural wall and to link the facing elements to each other, a plurality of specially designed clips are used. Each clip comprises a support flange, one or more base flanges, and one or more connecting flanges for insertion into the grooves in the facing elements. Each clip is fastened individually to the structural wall, therefore each facing element is individually secured to the structural wall leading to improved mechanical strength for the veneer wall. The profile of each clip depends on its particular function in the wall system. Three types of clips may be defined depending on where they are used in the wall system.

[0019] A first type of clip is used between upper and lower facing elements to link the upper and lower stone facing elements and to mount the stone facing elements to the structural wall. The first type of clip has a support flange, one or more base flanges depending from the support flange, preferably at a right angle, and one or more connecting flanges depending from the one or more base flanges, preferably at right angles. Preferably, the support flange has one or more apertures, preferably one aperture, for accepting fastening means for fastening the clip to the structural wall. The one or more connecting flanges are housed within the groove on the lower edge of the upper facing element and within the groove

on the upper edge of the lower facing element. The one or more connecting flanges preferably do not bottom-out in the grooves so that the weight of the facing elements is borne by the base flange.

[0020] The one or more base flanges of the first type of clip have a width just equal to the distance from the groove to the rear face of the facing elements. The length of the first clip is preferably much less than the length of the groove so that the clip may be positioned at any one of a plurality of positions along the groove. This provides great versatility in respect of where the clip will be fastened to the structural wall and the size of the facing element being used. This versatility leads to the ability to create virtually any pattern of stone or brick on the veneer wall while having each stone or brick mounted individually to the structural wall. This versatility also facilitates retrofitting of old buildings or sections of old buildings.

[0021] Facing elements for veneer walls may be of any convenient length and height. For example, some standard heights for stone include 3.5, 5.5 and 7.5 inches, while some standard lengths include 5.0, 10.5 and 15.5 inches. For bricks, standard width×height×length in inches are, respectively, for modular size 3.625×2.5×7.625, for utility size 3.625×3.625×11.625, and for premier size 3.5×3×9.75. The lengths and heights of facing elements can be customized for any particular application. Dimensions of facing elements are preferably set to allow the system to course out in an architectural grid. Architectural grids are preferably 4"×4" or 100 mm×100 mm depending on location to allow for windows, openings, corners and overall placement of walls. When using facing elements of various heights in a single veneer wall, it is preferable that the height of one bigger facing element is equal to the height of two smaller facing elements plus the height of the clip, so that level joint lines can be maintained across the span of the veneer wall.

[0022] Preferably, the first clip has a length less than half the length of the groove. However, it is possible to utilize first clips having lengths of 4-foot or 8-foot, for example, and having drainage holes in the base flange or flanges for single height coursing.

[0023] The first clip may be utilized in a similar manner to link facing elements in a side-by-side arrangement. Instead of orienting the one or more connecting flanges linking vertically arranged facing elements, the clip can be positioned to orient the connecting flanges horizontally. The flanges are then housed within the grooves on the side edges of adjacent facing elements.

[0024] A first embodiment of the first clip may be utilized in constructing a veneer wall having mortar joints. The first clip in the first embodiment has two base flanges in spaced-apart relation depending from the support flange. An upwardly depending flange depends from a first base flange and a downwardly depending flange depends from a second base flange. Therefore, when the upper and lower stone facing elements are linked by the clip, the spaced-apart base flanges provide space for a mortar joint between the upper and lower facing elements. In a similar way, mortar joints can be formed between horizontally adjacent facing elements. Preferably, the spaced-apart base flanges are about 10 mm apart, which automatically provides 10 mm mortar joints over the entire veneer wall, which is standard in the stone facing industry. Once the veneer wall has been constructed, the mortar joints may be filled with mortar by any suitable means, for example, mortar guns, grout pumps, trowels, etc. Mortar filling the mortar joint helps prevent the clip from deflecting or collapsing since the mortar fills the space between the base flanges thereby providing support for the base flanges. Mortar may also enter the grooves thereby helping key the upwardly and downwardly depending flanges into the grooves. This helps strengthen the clip and adds to overall strength of the wall system.

[0025] A second embodiment of the first clip may be utilized in constructing a veneer wall having mortar joints. The first clip in the second embodiment has a cylindrical base flange. Depending outwardly at a right angle from one end of the cylindrical base flange is a circular connecting flange. Depending inwardly at a right angle from the other end of the cylindrical base flange is a circular support flange. The diameter of the cylindrical base flange provides spacing for the mortar joint and is preferably about 10 mm. Since the connecting flange is circular, the orientation of the clip when fastened to the wall is not important as the connecting flange will be housed in the grooves of the facing elements on any side of the clip. Fastening the clip to the structural wall may be accomplished by inserting the fastening means (e.g. a screw) through the central bore of the cylindrical base flange and through an aperture in the support flange. Since the base flange is cylindrical, both the length and the height of the clip are equal to the diameter of the base flange. The width of the clip corresponds to the cylindrical height. Once the veneer wall has been constructed, the mortar joints may be filled with mortar by any suitable means, for example, mortar guns, grout pumps, trowels, etc. Mortar filling the mortar joint helps prevent the clip from deflecting or collapsing since the mortar fills the cylindrical bore of the base flange thereby providing support for the base flanges. Mortar may also enter the grooves thereby helping key the connecting flange into the grooves. This helps strengthen the clip and adds to overall strength of the wall system.

[0026] A third embodiment of the first clip may be utilized in constructing a mortarless veneer curtain wall. The first clip in the third embodiment has one base flange with upwardly and downwardly depending flanges depending from one end of the base flange. Therefore, when the upper and lower facing elements are linked by the clip there is virtually no space at the joint between the facing elements. To accommodate the thickness of the base flange, a thin portion of the edges at the rear face of the facing elements may be ground to form a seat. The third embodiment of the first clip can provide consistent horizontal leveling with a standard spacing (e.g. 0.03125 inches). Stacking facing elements in such a mortarless veneer curtain wall can give a stacked-stone appearance. The edges at the front face of the facing elements may be beveled to make the joint look like a mortar joint. Similarly, mortarless joints can be formed between horizontally adjacent facing elements.

[0027] A second type of clip is a sill clip useful for detail pieces such as window/door surrounds, candles, headers, keystones and stencil stones. Sills clips are similar to the first embodiment of the first clip except that they do not have either the upwardly or downwardly depending flange since there is no facing elements on one side of the sill clip.

[0028] A third type of clip is a starter strip. Starter strips are utilized to support facing elements of the veneer wall from below, from above or from one side, but not from any combination thereof simultaneously. Starter strips are particularly useful at the very bottom of the wall, the very top of the wall, the extreme sides of the wall, or over window or door openings. Starter strips are useful wherever there is a significant

boundary at an edge of the veneer wall. Starter strips may be straight or curved. Curved starter strips are particularly useful to span archways and the like.

[0029] The starter strip has a support flange, a base flange depending from the support flange, preferably at a right angle, and a linking flange depending from the base flange, preferably at a right angle and preferably depending in the same direction as the support flange. Preferably, the support flange of the starter strip has one or more apertures, preferably two or more apertures, for accepting fastening means for fastening the starter strip to the structural wall. The linking flange is housed within the groove on the edge of the facing element. The linking flange preferably does not bottom-out in the groove. Preferably the base flange of the starter strip has one or more drainage holes for permitting moisture to escape from the behind the veneer wall.

[0030] The starter strip has a length long enough to span two or more adjacent facing elements. The starter strip has a length preferably from about 3 to 12 feet, more preferably about 4 or about 8 feet. The base flange preferably has a width greater than the distance from the groove to the rear face of the facing element. The greater width accommodates other wall elements behind the facing elements.

[0031] Clips are fastened to the structural wall by fastening means, for example screws and nails, preferably screws. All clips and fastening means preferably comprise strong, durable material, for example plastic and/or steel, in particular galvanized steel or stainless steel. Stainless steel is preferred.

[0032] Typical wall construction, residential or commercial, comprises a structural wall clad with a veneer wall. The structural wall may be wood frame construction (e.g. 2×4 or 2×6 wood studs), steel frame construction, or poured concrete block construction. The structural wall preferably includes sheet material, for example wood-based sheet material (e.g. plywood, OSB), non-combustible sheet material or combinations thereof, mounted on the frame. In constructing a thin stone or thin brick veneer wall with the system of the present invention, clips are secured to the structural wall, particularly to the sheet material, and the facing elements set on the clips. The veneer wall is generally built from the bottom up in courses, and, if desired, each course is leveled to ensure a consistent appearance over the entire veneer wall. If mortar joints are used, the mortar joints are then filled with mortar, for example Type N Mortar, which is particularly recommended for thin stone applications. Type N Mortar is 1 part Type N Portland Lime cement mixed with 3 parts masonry sand. Type N Portland Lime cement is a mixture of 1 part Portland cement with 1 part hydrated lime. Type N-High Bond mortar (e.g. Quikrete™) is also particularly useful since it is available in pre-blended bags, and all one must do is add water.

[0033] Although the wall system of the present invention can be mounted on a structural wall without any other wall elements, it is preferable, and often required by building codes, to use other wall elements, in particular to protect the structural wall from the effects of moisture. Other wall elements include, for example, weather-resisting wall wrap (e.g. Tyvek™, Typar™, etc.), rubber membranes, vertical drainage board (e.g. J-DRain™), drain fabric (e.g. felt paper), etc.

[0034] Further features of the invention will be described or will become apparent in the course of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] 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:

[0036] FIG. **1**A is perspective view of a thin stone facing element useful in a wall system of the present invention;

[0037] FIG. **1**B is a top view of the stone facing element of FIG. **1**A;

[0038] FIG. **1**C is a side view of the stone facing element of FIG. **1**A;

[0039] FIG. **1**D is a perspective view of a thin stone facing element having a shorter length than the stone facing element of FIG. **1**A;

[0040] FIG. **1**E is an enlarged view of a portion of the side view of FIG. **1**C;

[0041] FIG. **2**A is a perspective view of a corner stone facing element useful in a wall system of the present invention;

[0042] FIG. **2**B is a top view of the corner stone facing element of FIG. **2**A;

[0043] FIG. **2**C is a right side view of the corner stone facing element of FIG. **2**A;

[0044] FIG. **2**D is a left side view of the corner stone facing element of FIG. **2**A;

[0045] FIG. **3**A is a perspective view of a starter strip of the present invention;

[0046] FIG. **3**B is a side view of the starter strip of FIG. **3**A;

[0047] FIG. **3**C is a front view of the starter strip of FIG. **3**A;

[0048] FIG. **3**D is a top view of the starter strip of FIG. **3**A;

[0049] FIG. **4**A is a perspective view of a first embodiment of a first clip of the present invention;

[0050] FIG. **4**B is a side view of the clip of FIG. **4**A;

[0051] FIG. **4**C is a front view of the clip of FIG. **4**A;

[0052] FIG. **5**A is a perspective view of a second embodiment of a first clip of the present invention;

[0053] FIG. **5**B is a side view of the clip of FIG. **5**A;

[0054] FIG. **5**C is a front view of the clip of FIG. **5**A;

[0055] FIG. **6**A is a perspective view of a third embodiment of a first clip of the present invention;

[0056] FIG. **6**B is a side view of the clip of FIG. **6**A;

[0057] FIG. **6**C is a front view of the clip of FIG. **6**A;

[0058] FIG. **7**A is a perspective view of a sill clip of the present invention;

[0059] FIG. **7**B is a side view of the sill clip of FIG. **7**A;

[0060] FIG. **7**C is a front view of the sill clip of FIG. **7**A;

[0061] FIG. **8**A is a side cross-sectional view of a section of a wall system of the present invention having mortar joints between stones; and,

[0062] FIG. **8**B is a side cross-sectional view of a section of a mortarless wall system of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0063] Referring to FIGS. **1**A-**1**D, thin stone facing element **1** comprises front face **2**, rear face **3**, upper edge **4**, lower edge **5** and two side edges **6**. Groove **7** in the upper edge runs the entire length of the stone facing element from one side to the other side. Groove **8** in the lower edge runs the entire length of the stone facing element from one side to the other side. The front face of the stone facing element is dressed for aesthetic appeal since the front face presents outwardly when mounted in a veneer wall. Stone facing element **1** is 15.5

inches long by 7.5 inches in height. Stone facing element **9** depicted in FIG. **1**D is the same as stone facing element **1** except that stone facing element **9** is only 5.0 inches long. Stone facing elements **1** and **9** may be used together in a thin stone veneer wall, and together with other sized stone facing elements if desired, to provide a more random appearance to the veneer wall.

[0064] Referring specifically to FIG. **1**E, an enlarged portion of the side view depicted in FIG. **1**C shows upper edge **4**, groove **7** in the upper edge, a portion of front face **2** and a portion of rear face **3**. Distance A is the thickness of stone facing element **1** and is 1.25 inches. Distance B is the distance from the groove to the rear face and is 0.625±0.0625 inches. Distance C is the depth of groove **7** and is 0.25−0/+0.125 inches. Distance D is the width of groove **7** and is 0.086 inches. Referring to FIGS. **1**A-**1**C, groove **8** in lower edge **5** has similar dimensions and location as groove **7** in the upper edge **4**. Groove size and location is similar in stone facing element **9** of FIG. **1**D.

[0065] Referring to FIGS. **2**A-**2**D, one-piece corner stone facing element **10** comprises short part **19***a* and long part **19***b* having front faces **12***a*,**12***b* respectively, forming a right angle. Upper edge **14** has groove **17** running the entire length of both the short part and the long part. Where the short part meets the long part, groove **17** undergoes a change in direction of 90-degrees. Groove **18** in lower edge **15** is similar to groove **17** in upper edge **14**. Left side edge **16***a* is the side edge of short part **19***a* and right side edge **16***b* is the side edge of long part **19***b*. The short and long parts have rear faces **13***a*, **13***b* respectively. Front faces **12***a*,**12***b* form the front (outer) face of the corner stone facing element and rear faces **13***a*,**13***b* form the rear (inner) face of the corner stone facing element. In building a corner of a veneer wall, corner stone facing elements may by stacked with the short and long parts in alternating directions in order to give a full Bed-Depth appearance to the corner.

[0066] Referring to FIGS. **3**A-**3**D, stainless steel starter strip **20** is 4 feet long and comprises support flange **21** depending upwardly at a right angle from one edge of base flange **22**. Depending upwardly at a right angle from the other edge of base flange **22** is linking flange **23**. Seven apertures **24** (only one labeled) in support flange **21** are 0.177 inches in diameter, which is sized to accept #8 stainless steel screws for fastening the starter strip to OSB, plywood and/or non-combustible sheets of a structural wall. Twelve drainage holes **25** (only one labeled) in base flange **22** permit drainage of moisture out the bottom of the starter strip. The first and last apertures of the seven apertures **24** are each 1.5 inches from their respective ends of the support flange and apertures **24** are 7.5 inches apart, measured from the centers of the apertures. The first and last drainage holes of the twelve drainage holes **25** are each 2 inches from their respective ends of the base flange and drainage holes **25** are 4 inches apart, measured from the centers of the drainage holes. The drainage holes are 0.25 inches in diameter.

[0067] Referring specifically to FIG. **3**B, a side (end) view of the starter strip is shown, but not to the same scale as FIGS. **3**A, **3**C and **3**D. Distance E is the height of the support flange, which is 1±0.125 inches. Distance F is the width of the base flange, which is 1−0/+0.0625 inches. Distance G is the height of the linking flange, which is 0.1875+0/−0.03125 inches.

[0068] The starter strip is made by stamping out the desired apertures and drainage holes in a single flat strip of #24 AWG stainless steel (0.027 inches thick), and then bending the strip appropriately to form the starter strip.

[0069] Referring to FIGS. **4**A-**4**C, stainless steel clip **30** is useful for linking upper and lower stone facing elements in a thin stone veneer wall with mortar joints. Upwardly depending flange **33***a* depends upwardly at a right angle from one edge of upper base flange **32***a*. Downwardly depending flange **33***b* depends downwardly at a right angle from one edge of lower base flange **32***b*. Upper and lower base flanges **32***a*,**32***b* respectively, are parallel to and spaced-apart from each other to form a mortar joint. Support flange **31** joins upper and lower base flanges **32***a*,**32***b* at the ends of the base flanges opposite the ends from which the upwardly and downwardly depending flanges depend. Upper base flange **32***a* depends from support flange **31** at a right angle from the upper edge of the support flange. Lower base flange **32***b* depends from support flange **31** at a right angle from the lower edge of the support flange. Aperture **34** in support flange **31** is 0.177 inches in diameter, which is sized to accept a #8 stainless steel screw for fastening the clip to OSB, plywood or non-combustible sheet of a structural wall.

[0070] Referring specifically to FIG. **4**B, distance H is the height of the support flange, which is 10±0 mm. This provides a mortar joint about 10 mm wide. Distance I is the width of the base flange which is 0.75±0.03125 inches and is about the same as the distance from a groove in a stone facing element to the rear face of the stone facing element. Distance I also provides a mortar joint about 0.75 inches deep. Distance J is the height of the clip, which is 0.78125 inches. Distance K is the height of upwardly depending flange **33***a*, which is 0.1875+0/−0.03125 inches. The height of downwardly depending flange **33***b* is the same as the upwardly depending flange.

[0071] Referring specifically to FIG. **4**C, distance L is the distance from the center of aperture **34** to the edge of the clip, which is 0.5 inches. Distance M is the length of the clip, which is 1 inch.

[0072] Referring to FIGS. **5**A-**5**C, stainless steel clip **90** is useful for linking upper and lower stone facing elements in a thin stone veneer wall with mortar joints. Circular outwardly depending flange **93** depends outwardly at a right angle from one end of cylindrical base flange **92**. Circular outwardly depending flange **93** is upwardly depending at **93***a* and downwardly depending at **93***b*. Support flange **91** forms a base of cylindrical base flange **92** at the end opposite outwardly depending flange **93**. Support flange **91** depends at a right angle from and inwardly into cylindrical base flange **92**. Aperture **94** in support flange **91** is 0.177 inches in diameter, which is sized to accept a #8 stainless steel screw for fastening the clip to OSB, plywood or non-combustible sheet of a structural wall. The cylindrical shape of base flange **92** and the circular shape of outwardly depending flange **93** provides n-fold symmetry around an axis through the middle of base flange **92** and aperture **94**, which removes the need to specifically orient upwardly and downwardly depending flanges in order to connect upper and lower facing elements in a thin stone or thin brick wall system.

[0073] Referring specifically to FIG. **5**B, distance HH is the interior diameter of the cylindrical base flange, which is 10±0 mm. This provides a mortar joint about 10 mm wide. Distance II is the width of the base flange (cylindrical height) which is 0.75±0.03125 inches and is about the same as the distance from a groove in a stone facing element to the rear face of the stone facing element. Distance II also provides a mortar joint

about 0.75 inches deep. Distance JJ is the height of the clip (circular diameter of outwardly depending flange **93**), which is 0.78125 inches. Distance KK is the distance that outwardly depending flange **93** extends beyond base flange **92**, which is 0.1875+0/−0.03125 inches.

[0074] Referring specifically to FIG. **5**C, distance LL is the distance from the center of aperture **94** to the edge of the clip, which is 0.390625 inches. Distance MM is the length of the clip (circular diameter of outwardly depending flange **93**), which is 0.78125 inches. Distances JJ and MM are the same.

[0075] Referring to FIGS. **6**A-**6**C, stainless steel clip **40** is useful for linking upper and lower stone facing elements in a thin stone veneer wall with mortarless joints. Upwardly depending flanges **43***a* depend upwardly at a right angle from one edge of base flange **42**. Downwardly depending flange **43***b* depends downwardly at a right angle from one edge of base flange **42**. Support flange **41** depends upwardly from base flange **42** at a right angle from the end of the base flange opposite the end from which the upwardly and downwardly depending flanges depend. Aperture **44** in support flange **41** is 0.177 inches in diameter, which is sized to accept a #8 stainless steel screw for fastening the clip to OSB, plywood or non-combustible sheet of a structural wall. Since clip **40** has a single base flange, the upwardly and downwardly depending flanges meet and no mortar joint is formed.

[0076] Referring specifically to FIG. **6**B, distance N is the height of the support flange, which is 10 mm. Distance O is the width of the base flange, which is 0.8125 inches, and is about the same as the distance from a groove in a stone facing element to the rear face of the stone facing element. Distance P is the height of upwardly depending flanges **43***a*, which is 0.1875+0/−0.03125 inches. The height of downwardly depending flange **43***b* is the same as the upwardly depending flanges.

[0077] Referring specifically to FIG. **6**C, distance Q is the length of downwardly depending flange **43***b*, which is 0.375 inches. Distance R is the length of one of the upwardly depending flanges **43***a*, which is 0.3125 inches. Both upwardly depending flanges have the same length. Distance S is the length of the clip, which is 1 inch.

[0078] Referring to FIGS. **7**A-**7**C, stainless steel sill clip **50** is useful for retaining stone facing elements around a window sill in a thin stone veneer wall with mortar joints. Downwardly depending flange **53** depends downwardly at a right angle from one edge of lower base flange **52***b*. There is no upwardly depending flange. Upper and lower base flanges **52***a*,**52***b* respectively, are parallel to and spaced-apart from each other to form a mortar joint. Support flange **51** joins upper and lower base flanges **52***a*,**52***b* at the ends of the base flanges opposite the end of the lower base flange from which the downwardly depending flange depends. Upper base flange **52***a* depends from support flange **51** at a right angle from the upper edge of the support flange. Lower base flange **52***b* depends from support flange **51** at a right angle from the lower edge of the support flange. Aperture **54** in support flange **51** is 0.177 inches in diameter, which is sized to accept a #8 stainless steel screw for fastening the clip to OSB, plywood or non-combustible sheet of a structural wall.

[0079] Referring specifically to FIG. **7**B, distance T is the height of the support flange, which is 10±0 mm. This provides a mortar joint about 10 mm wide. Distance U is the width of lower base flange **52***b* which is 0.75±0.03125 inches and is about the same as the distance from a groove in a stone facing element to the rear face of the stone facing element. Distance U also provides a mortar joint about 0.75 inches deep. Distance V is the height of the clip, which is 0.59375 inches. Distance W is the height of downwardly depending flange **53**, which is 0.1875+0/−0.03125 inches.

[0080] Referring specifically to FIG. **7**C, distance X is the distance from the center of aperture **54** to the edge of the sill clip, which is 0.5 inches. Distance Y is the length of the sill clip, which is 1 inch.

[0081] Clips may be made by stamping out appropriately spaced apertures in a single strip of #20 AWG stainless steel (0.0359 inches thick), bending the strip appropriately to form a bent strip of the correct profile, and then cutting individual clips out of the bent strip. Also, sill clips may be conveniently produced in small quantities on a job site by cutting off either the upwardly or downwardly depending flange of clips of FIG. **4**.

[0082] Referring to FIG. **8**A, a side cross-sectional view of a section of a thin stone veneer wall system having mortar joints depicts upper and lower stone facing elements **101**,**102** respectively, mounted to a wood stud wall clad with ⅝" plywood **103**. The upper and lower stone facing elements are linked by stainless steel clip **30**, which is secured to the plywood with #8 stainless steel screw **110**. Clip **30** provides for a 10 mm mortar joint **130** between the upper and lower stone facing elements. Lower stone facing element **102** is retained at its lower edge by starter strip **20**, which is secured to the plywood with #8 stainless steel screw **111**. Upper stone facing element **101** is retained at its upper edge by sill clip **50**, which is secured to the plywood with #8 stainless steel screw **112**. Sill clip **50** provides for a 10 mm mortar joint **150** beneath window sill **104**.

[0083] Between the plywood and the stone facing elements adjacent the plywood is a layer of Tyvek™ wrap **105**. Between the Tyvek™ layer and the stone facing elements is a corrugated vertical drainage panel, J-DRain™ 300, 106, and between the J-DRain™ 300 and the stone facing elements is a layer of felt cloth **107** to prevent mortar from clogging channels in the J-DRain™ 300. Screws **110**,**112** securing clip **30** and sill clip **50** respectively pierce the J-DRain™ 300 layer since the clips are only about as wide as the distance from the groove to the rear face of the stone facing elements. Screw **111** securing starter strip **20** does not pierce the J-DRain™ 300 since the starter strip is wider than the distance from the groove to the rear face of the stone facing element and is wide enough to accommodate the stone facing element and the J-DRain™ 300. Drainage holes in the base flange of the starter strip permit drainage of any moisture caught between the stone facing elements and the plywood.

[0084] Referring to FIG. **8**B, a side cross-sectional view of a section of a mortarless thin stone veneer wall system depicts upper and lower stone facing elements **201**,**202** respectively, mounted to a wood stud wall clad with OSB **203**. The upper and lower stone facing elements are linked by stainless steel clip **40***a*, which is secured to the OSB with #8 stainless steel screw **210**. Lower stone facing element **202** is retained at its lower edge by starter strip **20**, which is secured to the OSB with #8 stainless steel screw **211**. Upper stone facing element **201** is retained at its upper edge by stainless steel clip **40***b*, which is secured to the OSB with #8 stainless steel screw **212**. Clip **40***a* provides a standard spacing of 0.0625 inches between upper and lower stone facing elements **201**,**202**. The mortarless thin stone veneer wall continues upwardly from upper stone facing element **201** in a similar fashion.

[0085] Between the OSB and the stone facing elements adjacent the plywood is a layer of Tyvek™ wrap **205**. Between the Tyvek™ layer and the stone facing elements is a corrugated vertical drainage panel, J-DRain™ 300, 206. Screw **210** securing clip **40** pierces the J-DRain™ 300 layer since the clip is only about as wide as the distance from the groove to the rear face of the stone facing elements. Screw **211** securing starter strip **20** does not pierce the J-DRain™ 300 since the starter strip is wider than the distance from the groove to the rear face of the stone facing element and is wide enough to accommodate the stone facing element and the J-DRain™ 300. Drainage holes in the base flange of the starter strip permit drainage of any moisture caught between the stone facing elements and the OSB.

[0086] Other advantages which are inherent to the structure are obvious to one skilled in the art. The embodiments are described herein illustratively and are not meant to limit the scope of the invention as claimed. Variations of the foregoing embodiments will be evident to a person of ordinary skill and are intended by the inventor to be encompassed by the following claims.

1. A thin stone or thin brick wall system comprising:
(a) a structural wall
(b) a plurality of stone or brick facing elements, each facing element having a weight, a thickness, an upper edge and a lower edge,
the upper edge and lower edge of each facing element having a groove running along the edge at a distance from a rear face of the facing element, the groove having a width and a depth; and,
(c) a plurality of clips for linking the upper facing elements to the lower facing elements and to the structural wall
each clip having a first connecting flange housed within the groove in the lower edge of one of the upper facing elements and a second connecting flange housed within the groove in the upper edge of one of the lower facing elements,
the first connecting flange depending upwardly at right angles from a first base flange of the clip
the second connecting flange depending downwardly at right angles from a second base flange of the clip
said connecting flanges of the clip depending at right angles from a support flange in spaced apart relationship to each other to define a mortar joint therebetween
the support flange having one or more apertures for accepting fastening means for fastening the clip to the structural wall, and
the base flanges having a width greater than the distance from the rear face to the groove of the upper and lower facing elements.

2. The wall system of claim **1**, wherein the clip has a length less than half the length of the groove to permit positioning of the first clip at any one of a plurality of positions along the groove.

3. The wall system of claim **1**, wherein the one or more connecting flanges of each clip do not bottom-out in the grooves so that the weight of the upper facing elements is borne by the depending base flange.

4. The wall system of claim **1**, wherein the one or more apertures in the support flange is one aperture.

5. The wall system of claim **1**, wherein the mortar joint has a spacing of about 4 inches.

6. The wall system of claim **1**, wherein the plurality of facing elements have front faces with beveled edges.

7. The wall system of claim **1**, including one or more starter strips for supporting the bottom row of the facing elements,
each starter strip having an upwardly depending flange that is housed within the groove in the lower edge of one or more of the facing elements,
the upwardly depending flange of the starter strip depending at right angles from a base flange of the starter strip,
the base flange of the starter strip depending at right angles from a support flange of the starter strip,
the support flange of the starter strip having one or more apertures for accepting fastening means for fastening the starter strip to the structural wall,
the base flange of the starter strip having a width greater than the distance from the rear faces to the grooves of the facing elements, and
the starter strip having a length long enough to span two or more facing elements arranged side-by-side.

8. The wall system of claim **7**, wherein the base flange of the starter strip has one or more drainage holes.

9. The wall system of claim **1**, wherein the plurality of clips are made of stainless steel.

10. The wall system of claim **1**, wherein the thickness of each facing element is about 1.25 inches.

11. The wall system of claim **10**, wherein the weight of each facing element is less than about 15 lbs/square foot.

12. The wall system of claim **1**, wherein the structural wall comprises sheet material, and wherein the support flanges of the first clips are fastened to the sheet material.

13. The wall system of claim **12** further comprising vertical drainage board between the sheet material and the plurality of facing elements.

14. The wall system of claim **13** further comprising weather-resisting wall wrap between the drainage board and the sheet material.

15. The wall system of claim **14** further comprising a fabric layer between the drainage board and the plurality of facing elements.

* * * * *