Feb. 21, 1967 L. V. RAMONEDA 3,304,673

SIMULATED BRICK STRUCTURE

Filed March 26, 1964 3 Sheets-Sheet 1

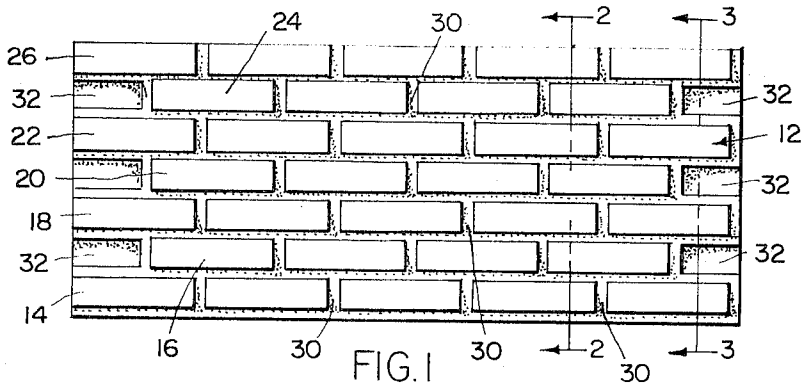


FIG. 1

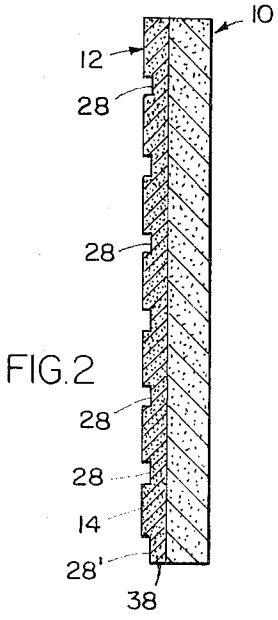


FIG. 2

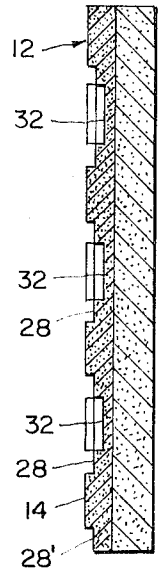


FIG. 3

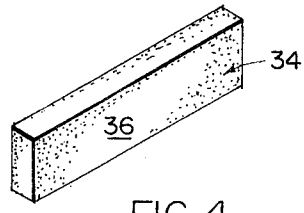


FIG. 4

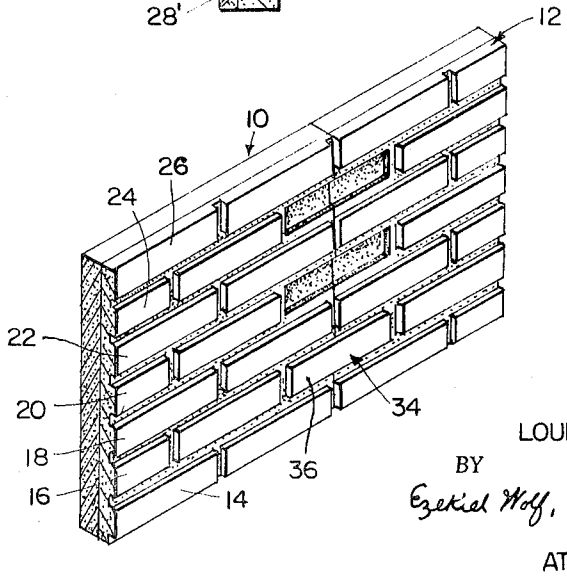


FIG. 5

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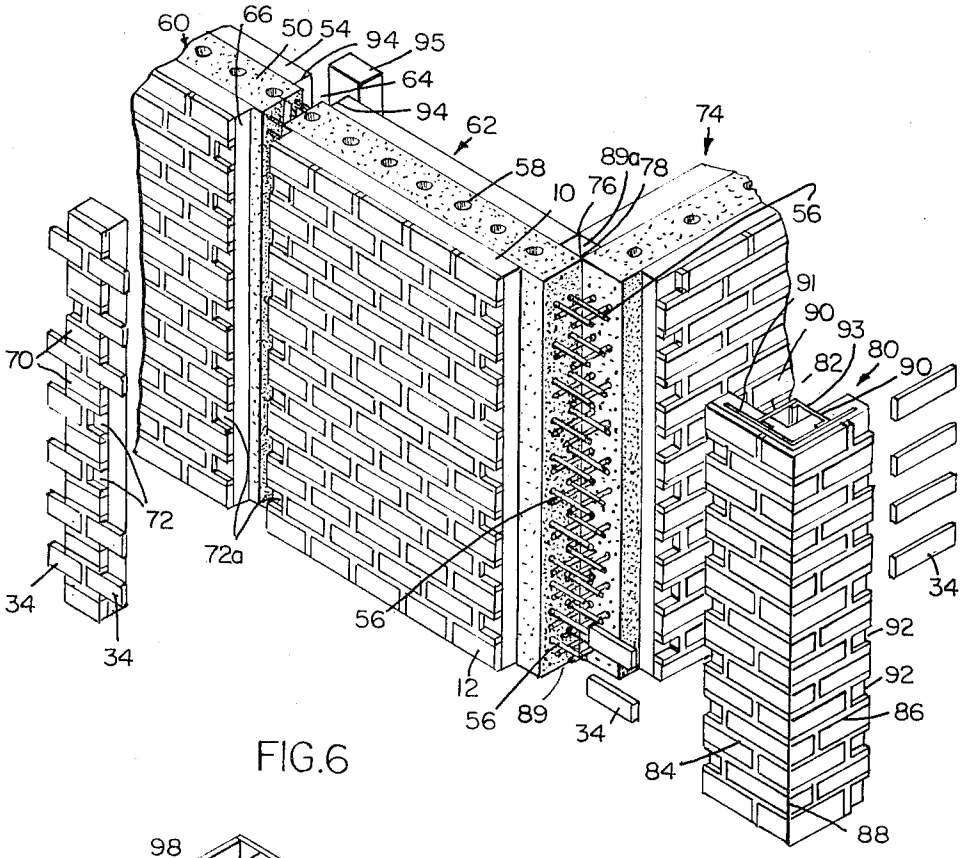


FIG.6

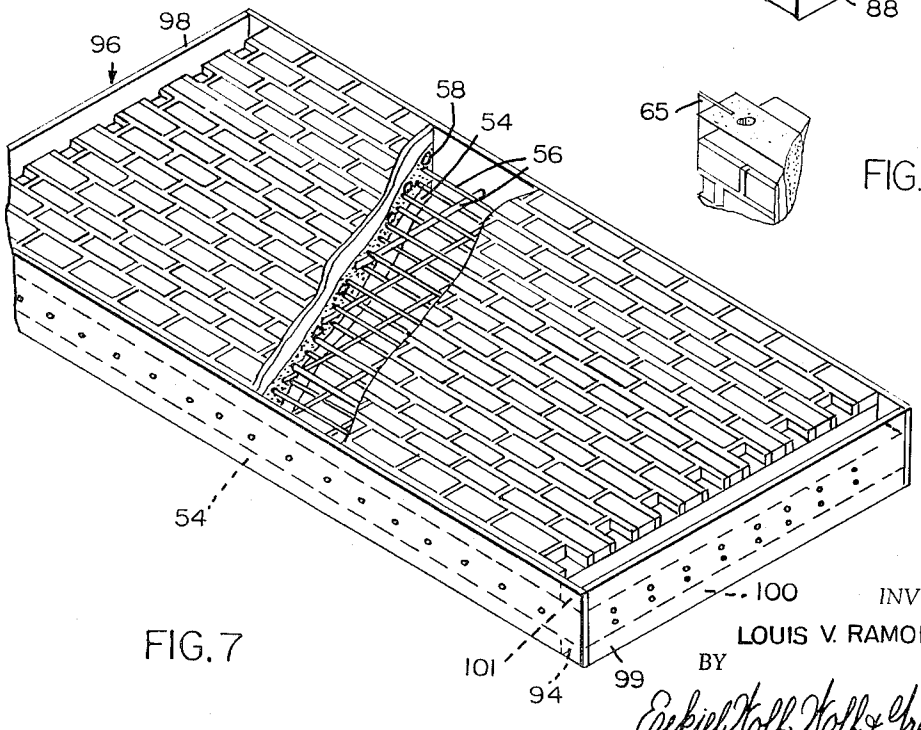


FIG. 7

FIG.8

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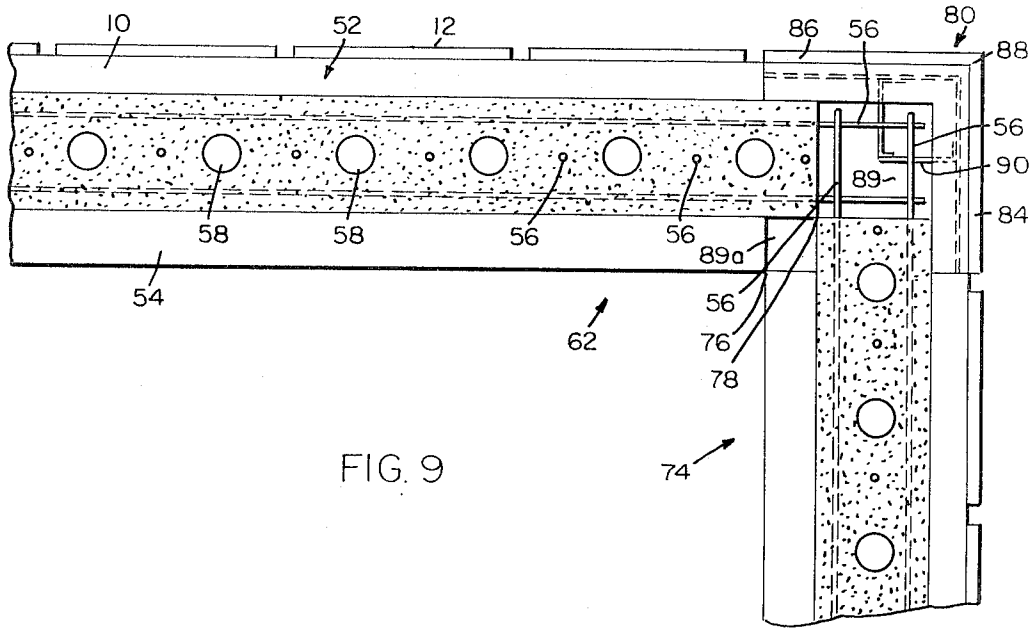


FIG. 9

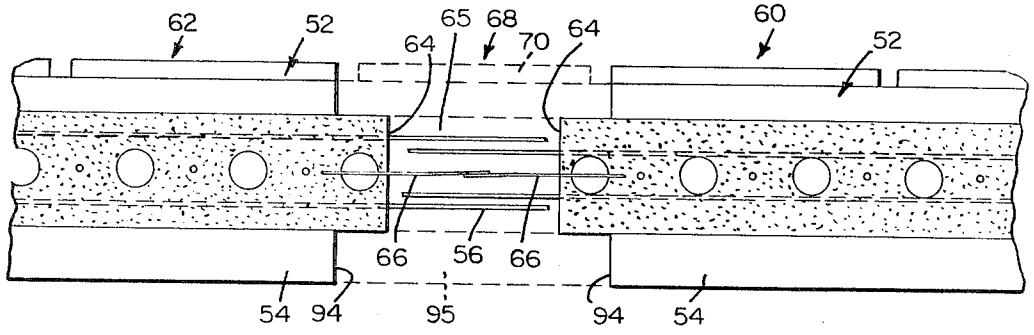


FIG. 10

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United States Patent Office 3,304,673 Patented Feb. 21, 1967

3,304,673

SIMULATED BRICK STRUCTURE

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Filed Mar. 26, 1964, Ser. No. 356,008
11 Claims. (Cl. 52—220)

This invention relates to precast wall sections and more particularly comprises a new and improved simulated brick wall and a method of making the wall in sections. This application is a continuation-in-part of my copending application Serial No. 314,363, filed October 7, 1963, now abandoned.

In recent years simulated masonry facings have been widely used in the building industry. Precast panels having a simulated masonry facing are relatively inexpensive as they can be precast in large sections to reduce labor costs. The better precast slabs are extremely difficult to distinguish from the masonry walls which they simulate when assembled in place and they have very fine heat insulating properties.

One problem heretofore encountered in the use of the simulated slabs has been the difficulty of concealing the joints between the adjacent panels. It is an object of the present invention to provide a precast panel which is adapted to be keyed to its adjacent panels with specially formed inserts so that the joints are indistinguishable from the simulated joints within the respective panels.

Another important object of this invention is to provide an inexpensive method of manufacturing precast slabs or panels.

Yet another important object of this invention is to provide a method of fabricating precast panels, which produces a product that more closely resembles the masonry wall being imitated.

To accomplish these and other objects the precast wall section of this invention includes a base layer made of a cement mix and a finish layer bonded to the base layer. The finish layer is embossed in a manner to define over its surface several courses of brick. The ends of alternate courses of brick are provided with cavities which will receive a portion of a separately fabricated simulated brick which will also lie in the mating cavity of an adjacent panel so that the joints between the panels are physically covered. In the fabrication of the wall section first the base layer and then the finish layer is poured in a mold, the second pouring following the first without giving the base layer an opportunity to set and harden. While the layers are still pliable a top mold is impressed upon the surface of the finish layer to emboss that layer with the simulated brick facing.

In accordance with another embodiment of this invention the precast wall section is united with a concrete core to form a complete wall structure. The concrete core may be provided with reinforcing rods and conduits to receive water and electrical ducts. The precast wall panel and core may themselves be preunited so that the wall may be erected in sections. In the preferred form of this embodiment, the concrete cores carry vertically extending neoprene gaskets that form seals at the vertical joints between adjacent wall sections.

These and other objects and features of this invention along with its incident advantages will be better understood and appreciated from the following detailed description of several embodiments thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

FIG. 1 is a front view of a panel constructed in accordance with this invention;

FIGS. 2 and 3 are cross-sectional views taken along the corresponding section lines in FIG. 1;

FIG. 4 is a perspective view of one tying or keying simulated brick used to join two panels of the type shown in FIGS. 1–3;

FIG. 5 is a fragmentary view of two panels illustrating the manner in which the simulated brick of FIG. 4 ties the two panels together;

FIG. 6 is an exploded perspective view of a wall constructed in accordance with another embodiment of this invention;

FIG. 7 is a perspective view suggested the manner in which one wall section of FIG. 6 is fabricated;

FIG. 8 is a fragmentary perspective view of one section of the wall of FIG. 6; and

FIGS. 9 and 10 are top views of different portions of a wall showing the manner in which the joints are constructed.

In FIG. 1 the front view of one precast wall section is shown, which simulates 7 courses of brick, 5 bricks wide. The panel or section is basically composed of a base layer **10** and a front layer or facing **12** which together comprise the entire panel. The facing layer **12** is specially embossed so that it has the appearance of a portion of a brick wall.

The base layer **10** can be made of a mixture of a porous silicate composition such as perlite, Porland cement and water. Typically the mix may include 3 parts perlite, one part Portland cement and sufficient water to render it a very heavy bodied slurry. The front or finish facing **12** may be made of a mixture of fine sand, Portland cement, water and a coloring agent such as red oxide of iron to simulate the brick work. A satisfactory mixture for the facing layer may be composed of 3 parts of fine river sand, one part Portland cement, approximately 4% of red oxide and water.

The several courses of brick **14**, **16**, **18**, **20**, **22**, **24** and **26** are separated by horizontal recesses **28** approximately ¼ to ½ inch deep and approximately ¼ inch wide. These recesses simulate the bed joints between the several courses. The end joints in the wall panel are simulated by vertical recesses **30** which extend at spaced intervals between adjacent parallel and horizontal recesses **28**. The vertical recesses **30** have substantially the same depth and width dimensions as the horizontal recesses **28**.

It is evident in FIG. 1 that the courses of brick **16**, **20** and **24** simulated by the horizontal and vertical recesses **28** and **30** are shorter than the other courses, as the end joints of each course are staggered, and every other course in the panel has 4 bricks while the top, bottom and two intermediate courses have 5 simulated bricks. Thus, the rectangular panel in fact is provided only with full bricks in each of the courses, and no half bricks are shown. At the end of the courses **16**, **20** and **24** cavities **32** are provided, which cavities are bordered by adjacent horizontal recesses **28** and a vertical recess **30**. The cavities **32** are deeper than the recesses **28** and **30**, and each cavity is adapted to receive a portion of a linking simulated brick of the type shown in FIG. 4.

In FIG. 4 one linking brick is shown, which is made of the same material and cast in the same manner as the outer layer **12** of the panel. The linking simulated brick **34** is approximately ¾ of an inch in thickness, is the same height as the cavity **32** and is approximately twice as long as the cavity. Thus, when two panels are placed in abutting relationship as shown in FIG. 5 one linking brick **34** may be positioned in the two mating cavities of the adjacent panels. When placed in the cavities the front surface **36** of the linking brick **34** lies in the plane of the other bricks forming an integral part of the panels.

In FIGS. 2 and 3 it will be noted that the lower margin **38** of the facing layer **12** is provided with a recess **28'** below the lowermost course **14** so that when the panel is placed on a wall above an identical panel that recess

28' will simulate the bed joint between the course **14** of simulated brick in the upper panel and the course **26** in the panel below. One end of each panel may similarly be provided with the short vertical recesses simulating the end joints while the other end may terminate flush with the end bricks in the rows of 5 simulated bricks. Thus, a uniformity may be achieved at the joints between panels when the panels are nailed or otherwise secured in place against the backing of the structure on which they are used.

Having described in detail the prefabricated panels as well as the method to which adjacent panels are mounted and joined by the linking simulated bricks, I will now describe the manner in which the panels may be made.

In accordance with one embodiment of this invention a rectangular form is provided appropriately coated with a compound which inhibits the mix from sticking to the form or mold walls. After the mold is so treated or lined with the compound the mix which forms the base layer of the panel is poured in place. As suggested, this mix may be composed of perlite, Portland cement and water and should be a rather heavy bodied slurry. The mix which makes up the base layer is leveled and tamped to cause a uniform depth for the base layer. The flat condition of the top of the base layer may be achieved even faster by screeding the layer with a bar. Immediately after the uniform condition of the base layer is achieved and before that layer has had an opportunity to harden the second mix is poured into the mold above the base layer. This second mix as suggested may be composed of fine river sand, Portland cement, water and a red oxide of iron to simulate the brick color. After the second layer is poured in place the entire assembly is then pressed in a low pressure hydraulic press to improve the firmness and rigidity of the entire mass as well as to provide the recesses and cavities in the top or surface layer to simulate courses of brick separated by bed and end joints.

While in the preferred method of making the panels the top of facing layer **12** is poured and formed in the mold, as an alternate method the surface layer **12** may be cast separately in an independent mold and be provided with the simulated brick facing by embossing its surface with a press. This hardened and separately cast surface layer **12** may be laid in place in a second form occupied by the separately poured base layer **10**. By putting the previously cast layer on the soft base layer an adequate bond may be formed between the two layers.

The linking bricks **34** may be separately cast, preferably from the same material as the facing layer **12** of the panel. Small molds may be provided to separately cast each of the linking bricks.

From the foregoing description numerous advantages of the emobdiment shown in FIGS. 1–5 will be apparent. Because of the manner in which the panels are formed, the joints between adjacent panels are hidden by the linking bricks so that the panel end joints are not noticeable. The simple manner in which the panels are made allows them to be fabricated at a minimum of expense, and in turn the builder who uses them may quickly assemble an entire wall and realize great savings in the cost of labor. All of these advantages make the product of this invention particularly suitable.

In FIGS. 6–10 the panel shown in FIGS. 1–5 is incorporated into a complete wall structure which also includes a core and an inner finished surface. Referring specifically to FIG. 6 wherein several sections of wall are shown, it will be noted that each section includes a core **50**, a front panel **52** and an inner finished panel **54**. The core **50** is made of structural concrete through which extend both in horizontal and vertical directions steel reinforcing rods **56** so as to provide the wall section with substantial structural properties. The horizontal rods extend approximately 4 inches beyond the sides of core **50**. Extending vertically through the concrete core are spaced conduits **58** which are made of any material having the strength to withstand the pressures applied to the conduits when the core is formed and which will withstand the elements without deteriorating. The conduits through the cores may be used to extend water pipes or electrical conduits incorporated into the structure formed from the walls. Typically the core may be approximately 3⅜ inches in thickness which will impart sufficient structural strength to the wall and provide enough room for the conduits without using excessive amounts of material.

The front panel **52** may be identical to the panel shown in FIGS. 1–5 and include the base layer **10** and the front or facing layer **12**. The base and front layers **10** and **12** may be made with the materials and in accordance with the method set forth above.

The inner panel **54** may typically be made of perlite concrete of the same mix as the base layer **10** of front panel **52**. Thus, the inner panel **54** may typically be composed of a mix which includes 3 parts perlite, 1 part Portland cement and sufficient water to render it a very heavy bodied slurry. The inner panel **54** may be approximately 2 inches in thickness, while the front panel **52** composed of the inner layer **10** and the facing layer **12** is approximately 2¼ inches; the layer **10** may be approximately 1¼ inches in thickness.

In FIGS. 6 and 10 it will be noted that the wall sections **60** and **62** are formed with their cores extending somewhat beyond the ends of the front and inner panels **52** and **54**. The end surfaces **64** of the cores of walls **60** and **62** are spaced approximately 4 inches apart when the two are assembled during the erection of a structure from the sections. When so spaced the horizontal reinforcing rods of each section substantially abut the adjacent end face **64** of the next section, as suggested in FIG. 10. Each end wall **64** has a weatherproofing strip **66** embedded therein and made of a flexible material such as neoprene, and the two strips in the facing end walls **64** abut one another to form a waterproof joint when the sections are placed in that relationship and cement is subsequently poured to structurally tie the two sections together.

When the two sections **60** and **62** are placed in end-to-end relationship with the core end walls **64** spaced from one another, a greater gap exists between the edges **66** of the front panels **52** of the respective sections. Preferably this gap is approximately 8 inches wide, the length of one brick, or simulated brick as in this invention. This gap may be filled by a narrow panel **68** as suggested in the exploded view of FIG. 6. The panel **68** which is the same height as the front panels **52** of the two sections is only one brick wide and in every other course a full brick **70** is formed in the panel. In the alternate courses, two half-brick recesses **72** are formed which align with the half-brick recesses **72*a*** at the ends of the adjacent courses of the front panels **52** of the two sections **60** and **62**. The cavities may then be filled by linking bricks **36** in the same manner as suggested in FIGS. 4 and 5. In FIG. 6 the linking bricks are actually shown disposed in the half-brick recesses and extend beyond the panel sides so as to reach the recesses **72*a*** when the panel **68** is properly positioned. Thus, when the two sections are brought together as described, the seam between the two sections may be hidden just as effectively as the seam in the embodiment in FIG. 5.

A small panel is required to fill the gap between the ends **94** of the inner panels of the wall sections **60** and **62**. The gap between them may be filled by single ply panel of the proper width and made of the same perlite concrete as the panel **54**. Such a panel is suggested in FIG. 6 at **95**. Alternatively, a section such as shown at **68** could be used with the outer layer facing inwardly, as the gap between the end walls **94** is exactly equal to the gap between the end walls **66** and the width of the section **68**. In this case the inner layer of the section could be used as the exposed face. After the gaps between the

ends of the panels have been filled by the narrow panels **68** and **95**, the space **65** between the end walls **64** of the cores may be filled by pouring concrete **67** into it, because the narrow panels and the cores define an enclosed mold for pouring. The poured concrete will anchor the two sections together by acting through the exposed ends of the horizontal reinforcing rods.

FIGS. 6 and 9 also suggest the manner in which two sections may be brought together at right angles to one another. Thus, section **62** is shown to be disposed at right angles to section **74**. It will be noted that the two sections **62** and **74** are placed in contact with one another at the corners **76** and **78**, respectively. When the sections are so oriented, the ends of the horizontal reinforcing rods overlap one another and lie in the corner space **89** as shown in FIGS. 6 and 9. After they are placed in the relationship shown the corner is closed by the L-shaped corner panel **80** which includes the two panel parts **84** and **86** joined together at corner **88**. Just as in the front panels **52**, every other course of brick in the corner panel **80** is provided with a recess **92** which mates with a recess in the adjacent course of the adjacent panel, and the mating recesses may be filled with the linking bricks **34** shown in FIG. 4.

The corner panel **80** carries anchors **90** as is clearly shown in FIGS. 8 and 9. The anchors include strips **91** embedded in the base layers **10** of the panel parts **84** and **86**, as well as strips **93** which extend rearwardly from the base layers generally perpendicular thereto into the cavity **89**.

After the corner panel is assembled in place, the cavity **89** is filled with a core of concrete poured in place, which ties the entire structure firmly together by means of the anchors and exposed ends of the horizontal reinforcing rods. The smaller cavity **89***a* may also be poured at the same time to complete the inner panel at the corner.

The portions of the core poured in place, namely the concrete filling the spaces **65**, **89** and **89***a*, may be made of the same mix as the prefabricated core sections, or some similar concerete may be used. Ideally all of the concrete used contains a waterproof material to maintain the interior of the structure dry. The perlite used in the inner and outer panels provides the desired fire resistance to the building.

From the foregoing description it is evident that no half-bricks are found in the outer surface of a completed wall inwardly of the wall ends, even though the wall is made up of several sections placed end-to-end. At the end of each section where half-bricks would ordinarily appear cavities are provided to mate with cavities in adjacent sections so that linking bricks may be used to cover the seams between the two panels.

In FIG. 7 the manner in which a wall section may be fabricated is suggested. In that figure a mold **96** is shown in the form of a relatively shallow box open at the top **98** but closed on the bottom and on the four sides. The broken wall in the box suggests that the inner panel **54** is placed in the bottom of the mold and the ends **94** terminate inwardly of the end walls **99** of the mold. Fillers **100** are used so as to make the effective width of the mold **96** somewhat shorter than the overall box width in the plane of the panel **54**. Next, the aggregate which forms the core **50** is poured in the mold after the reinforcing bars **56** and conduits **58** are positioned in the mold. Before the mix of the core hardens the previously fabricated outer panel **52** may be placed on top of the core layer so that proper adhesion is achieved among the three plies. If the panel **52** is prefabricated and placed in the mold **96** as an entity, the panel **52** should be centered so as to be aligned with the rear panel **54**. If the panel **52** is to be formed within the mold, its base layer **10** should not be poured until the core **50** at least partially sets and fillers **101** are placed at the ends **99** to effectively reduce the width of the mold. While in the foregoing description of the fabrication of the wall section **60** it is suggested that the base panel **94** and the outer panel **52** be previously fabricated before being placed in the mold **96** and that the core should be formed in the mold, it is to be understood that each may separately be fabricated or all may be fabricated in the mold **96**.

Because numerous modifications may be made of this invention without departing from its spirit, it is not intended to limit the breadth of this invention to the embodiments illustrated and described. Rather, it is intended that the scope of this invention be limited to the appended claims and their equivalents.

What is claimed is:

1. A precast wall section comprising,
an inner panel,
a core of appreciably greater thickness than the inner panel secured to the panel,
a flexible weatherproofing strip embedded in and extending outwardly of said core and constructed and arranged to lie in overlapping relationship with a weatherproofing strip of an adjacent wall section,
an outer panel secured to the core on the side opposite the inner panel and of a thickness substantially less than the thickness of the core,
a simulated multi-brick finish layer forming part of the outer panel and composed of staggering rows of simulated bricks and simulated bed and end joints,
shallow recesses provided in the ends of alternate horizontal rows of simulated bricks,
and separately cast bricks disposed partially in and bonded in the recesses and adapted to lie in the mating recesses of adjacent wall sections.

2. A precast wall section as described in claim **1** further characterized by a base layer forming part of the outer panel and secured to the finish layer and the core.

3. A precast wall section as described in claim **1** further characterized by vertically extending conduits being disposed in the core for receiving utility service ducts.

4. A precast wall section as described in claim **1** further characterized by reinforcing rods extending horizontally and vertically in the core.

5. A precast wall section as described in claim **1** further characterized by the core being longer than the inner and outer panels and with the ends of the core extending beyond the ends of the panels.

6. A precast wall comprising,
a pair of wall sections each having a precast concrete core and inner and outer panels with the core of each section extending beyond the sides of the outer panels,
said sections being disposed end-to-end with their cores spaced from one another to provide a cavity and the outer panels being spaced a greater distance to provide a gap,
a narrow outer panel section disposed over the ends of the cores and fitting into the gap between the spaced ends of the outer panels,
and a concrete core section filling the cavity behind the narrow panel section.

7. A wall section in accordance with claim **6** and further comprising each of said ends of each section carrying an outwardly extending continuous, flexible, weatherproofing strip with the weatherproofing strips of each section lying in overlapping sealing engagement.

8. A precast wall as defined in claim **7** further characterized by, each of said outer panels having a simulated brick outer face and simulated end and bed joints,
cavities provided at the ends of alternate rows of the simulated bricks in the panels with the cavities at adjacent ends mating with one another,
and linking bricks filling the mating cavities.

9. A precast wall as defined in claim **8** further characterized by, conduits embedded in the core for receiving utility ducts.

10. A precast wall as defined in claim **9** further characterized by said cores extending beyond the sides of the inner panels,

a narrow inner panel section disposed over the ends of the cores and joining the ends of the inner panels,

said narrow inner and outer panels providing forms for the concrete core section enabling said section to be poured in place.

11. A precast wall as defined in claim **10** further characterized by horizontal and vertical reinforcing rods being embedded in the cores,

said horizontal rods extending beyond the ends of the cores and being embedded in the core section.

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