Title: CONSTRUCTION SYSTEM FOR BUILDINGS

Abstract: A block used as a building block in constructing a wall comprises a main body comprising an insulating core with a concrete inner shell member and a concrete outer shell member respectively covering inner and outer lateral surfaces of the insulating core. Drainage channels extend from top to bottom in the main body on the side of the concrete outer shell member. Upstanding slots at opposed ends of the main body are defined to captively receive a connector for end to end engagement of a pair of the block.
Published:  with international search report (Art. 21(3))
CONSTRUCTION SYSTEM FOR BUILDINGS

CROSS-REFERENCE TO RELATED APPLICATION

The present application claims priority on United States Provisional Application Serial no. 61/868,793, filed on August 22, 2013.

FIELD OF THE APPLICATION

The present application relates to construction systems for erecting dwellings and, more particularly, to such systems involving concrete construction blocks.

BACKGROUND OF THE ART

Concrete is a commonly used material for erecting buildings. Concrete is structurally strong and is made of relatively inexpensive elements, including aggregate, water and a binder such as cement. However, concrete buildings typically require a non-negligible amount of manpower, equipment and temporary structures, to pour the concrete into forming walls of a dwelling.

Accordingly, various types of construction systems involving prefabricated concrete blocks have been developed in order to reduce time spent in the on-site erection of walls, by forming the blocks off site with specialized equipment, and simply assembling the prefabricated blocks on site.

It remains nonetheless desirable to simplify the erection of exterior walls with prefabricated blocks, for instance by providing added-value prefabricated blocks, that do not need the use of additional materials (e.g., such as the use of a mortar) to define a finished wall.
SUMMARY OF THE APPLICATION

It is therefore an aim of the present application to provide a novel construction system including construction blocks.

Therefore, in accordance with a first embodiment of the present application, there is provided a block used as a building block in constructing a wall, comprising: a main body comprising an insulating core with a concrete inner shell member and a concrete outer shell member respectively covering inner and outer lateral surfaces of the insulating core; at least one drainage channel extending from top to bottom in the main body on the side of the concrete outer shell member; and upstanding slots at opposed ends of the main body defined to captively receive a connector for end to end engagement of a pair of the block.

Further in accordance with the first embodiment, a raised longitudinal portion projects upwardly from and extending along the main body from end to end of the block.

Still further in accordance with the first embodiment, a longitudinal channel is in an underside of and extending along the main body from end to end of the block, the longitudinal channel having a shape complementary to that of the raised longitudinal portion for mating engagement when one of the block is stacked on another of the block.

Still further in accordance with the first embodiment, a sloping longitudinal portion is between a top surface of the raised longitudinal portion and a flat longitudinal surface of the main body, at least on the side of the concrete outer shell member.

Still further in accordance with the first embodiment, the at least one drainage channel has a top open end in the main body positioned outwardly of the raised longitudinal portion.
Still further in accordance with the first embodiment, a longitudinal clearance extends along the main body from end to end of the block, the longitudinal body being in fluid communication with the at least one drainage channel and forming a generally horizontal channel when one of the block is stacked on another of the block.

Still further in accordance with the first embodiment, the main body comprises at least one vertical throughbore for receiving a vertical structural member, the at least one vertical throughbore of one of the blocks being aligned with the at least one vertical throughbore of another of the blocks when the blocks are stacked on one another.

Still further in accordance with the first embodiment, each of the upstanding slots has at least a portion with a T-shaped sectional shape.

Still further in accordance with the first embodiment, each of the upstanding slots has at least a portion with an L-shaped sectional shape

Still further in accordance with the first embodiment, at least a portion of the upstanding slots is located outwardly of the at least one drainage channel.

Still further in accordance with the first embodiment, an upper longitudinal shoulder extends along at least the concrete outer shell member end to end of the block, and a lower longitudinal projection extending along at least the concrete outer shell member end to end of the block, the upper longitudinal shoulder being below a lowermost top surface of the main body while the lower longitudinal projection being below a lowermost bottom surface of the main body, the longitudinal shoulder and the longitudinal projection being in mating engagement when one of the block is stacked on another of the block.
In accordance with a second embodiment, there is provided an assembly for forming a wall, comprising: a plurality of the block as described above; and a plurality of connectors for interconnecting pairs of the block being positioned end to end.

Further in accordance with the second embodiment, each of the connectors has a first portion captively received in an end of one of the blocks of a pair, and a second portion captively received in an end of another of the blocks of a pair.

Still further in accordance with the second embodiment, the connectors and the upstanding slots of respective pairs concurrently form a sliding joint for sliding the connectors into the respective pairs.

Still further in accordance with the second embodiment, the sliding joint has a direction that is transverse to a longitudinal direction of the blocks.

Still further in accordance with the second embodiment, each of the connectors has an inner portion located inward of the at least one drainage channel and an outer portion located outward of the at least one drainage channel.

Still further in accordance with the second embodiment, each of the connectors has an H-shaped section, a U-shaped section, and an arm interrelating the H-shaped section to the U-shaped section.

Still further in accordance with the second embodiment, each of the connectors has a deflector portion transversely positioned in an intersection between interconnected pairs of the block, the deflector portion between located outward of the at least one drainage channel.

Still further in accordance with the second embodiment, an arm is between the deflector and the U-shaped section, whereby the deflector is integral with the connector in a monolithic piece.
In accordance with a third embodiment of the present disclosure, there is provided a connector for connecting construction blocks, the connector comprising: a first post and a second post; a bridge connecting the first post to the second post; and a complementary mating configuration between a top surface of the first and second post, and a bottom surface of the first and second post, whereby one of the connector stacked on another of the connector are in mating engagement.

Further in accordance with the third embodiment, the bridge is adjacent to the top surface of the first post and of the second post.

Still further in accordance with the third embodiment, the complementary mating configuration comprises a finger projecting downwardly from the first and second portion, and a corresponding receptacle open upwardly.

Still further in accordance with the third embodiment, the first post and the second post are tubular members.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a perspective view of a construction block in accordance with an embodiment of the present disclosure;

Fig. 2 is a perspective view of a pair of the construction block of Fig. 1 as arranged end to end, with a connector in the process of being inserted therebetween;

Fig. 3 is a top plan view of an end of construction of Fig. 1, with the connector;

Fig. 4 is a sectional side view of construction blocks stacked to form a wall;
Fig. 5 is a perspective view of a pair of the construction block of Fig. 1 as arranged end to end, without a connector therebetween;

Fig. 6 is a top plan view of one of the construction blocks, configured to be used as an overblocka base block;

Fig. 7 is a top plan view of one of the construction blocks, configured to be used as a base block an overblock;

Fig. 8 is a perspective view of the connector of Fig. 2;

Fig. 9 is a profile side view of the connector of Fig. 8;

Fig. 10 is a perspective view of a pair of corner construction blocks as arranged in a miter joint, with a corner connector inserted therebetween;

Fig. 11 is a perspective view of the corner connector of Fig. 10;

Fig. 12 is a front elevation view of the corner connector of Fig. 11; and

Fig. 13 is an assembly perspective view of corner construction blocks stacked to form a wall.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to Fig. 2, construction blocks of a construction system of the present disclosure are generally shown at 10, as positioned side by side for being interconnected to one another in forming a wall. The construction blocks 10 are installed end to end so as to form rows of a wall. Rows are assembled one on top of the other so as to erect the wall vertically. As discussed hereinafter, the construction blocks 10 are configured to act as a rain screen to reduce the risk of water infiltration. Although the construction blocks 10 are shown as being elongated straight members, the constructions blocks 10 may be angled to form corners,
arcuate walls, etc. Moreover, the construction blocks 10 may be manufactured in different lengths, or may be cut on site to suitable lengths.

Referring to Fig. 1, the construction block 10 has a main body defined at least by an insulating core 12, as well as an outer shell 13A and an inner shell 13B, both made of concrete.

The insulating core 12 is typically made of a polymer such as a foam (e.g., urethane), and will provide the insulating properties to the construction block 10, as well as the structural properties once properly stacked. The outer shell 13A and the inner shell 13B provide the structural properties to the construction block 10. It is pointed out that indeed, the insulating core 12 will provide part of the structural integrity of the wall erected with the construction blocks 10, for instance by the insertion of connectors 14 at the junction between the blocks 10, to interconnect the blocks 10. The outer shell 13A and the inner shell 13B provide the protective properties to the construction block 10, forming a shield for the insulating core 12. Moreover, rods and grout may be used with the insulating core 12, as will be described hereinafter. Deflectors 15 may also be inserted in the insulating core 12 at the junction between adjacent blocks 10, to form a part of a rain screen for the wall formed of the blocks 10, as will be described hereinafter. The deflectors 15 may be an integral part of the connectors 14, as shown in the illustrated embodiment.

Referring to Fig. 3, the insulating core 12 may have throughbores 20 and 20'. Although a plurality of throughbores 20 is illustrated in Fig. 1, it is considered to provide one or more of the throughbores 20 along the construction block 10. The throughbores 20 are equidistantly spaced along the longitudinal axis of...
the construction block 10. As shown in Figs. 3 and 6, a pair of the throughbores 20' may be side by side in a thickness direction of the construction block 10 near the ends thereof. As will be described hereinafter, the pair of throughbores 20' may be used in base construction blocks 10 to level the construction blocks 10 relative to the ground.

An upper surface of the insulating core 12 is provided with a raised longitudinal portion 22. The raised longitudinal portion 22 is shown having a generally flat top surface 22A, and sloping edge surfaces 22B, although any other appropriate shape is considered. Shoulders 22C are provided for each sloping edge surface 22B, and may be parallel to the flat top surface 22A, or sloping toward the respective shells 13. On the undersurface of the insulating core 12, there is defined a complementary shape to that of the top, for mating engagement when blocks 10 are mounted one atop the other, in the manner shown in Fig. 4. Hence, a longitudinal channel 23 is centrally located in the insulating core 12 of the block 10, to receive therein the raised longitudinal portion 22 of block 10 upon which it will be seated. Accordingly, when construction blocks 10 are installed one on the other, the raised longitudinal portion 22 of a bottom construction block 10 is mated with the channel 23 of a top construction block 10. By this mating engagement, the insulating cores 12 are aligned one on top of the other, and can move along one another in translation, before being fixed with rods, grout, etc.

As seen concurrently in Figs. 1 and 5, connector slots 24 are defined at ends of the insulating core 12 (one shown in the Figs.). The connector slots 24 are shown as being substantially vertical and as extending from the raised longitudinal portion 22 to the channel 23, although it is considered to have the
connector slots 24 being open to a single one of the raised longitudinal portion 22 and channel 23. The connector slots 24 are shown as having a T-section 25 so as to have a captive portion from a top plan standpoint cooperating with the connectors 14. Moreover, the connector slots 24 may also comprise an L-section 26.

Referring to Fig. 5, blocks 10 are positioned end to end, showing that the T-sections 25 and the L-sections 26 are aligned, and also showing a gap 27A between the T-sections 25 and the L-sections 26. Another gap 27B, exteriorly positioned relative to the L-sections 26, may also be present, for reasons described hereinbelow. The arrangement of T-sections 25, L-sections 26 and gaps 27A/27B is a function of the geometrical section of the connectors 14, whereby the connectors 14 may be slid into engagement therein in the manner shown in Fig. 2, to reach the assembly of Fig. 4.

Referring to Fig. 3, vertical channels 28 may extend through the insulating core 12, on the side of the outer shell 13 A, i.e., on the rain screen side of a wall erected with the construction block 10. The vertical channels 28 are illustrated as being located in the shoulder 22C, thereby defining a vertical channel for water drainage, with the inlet of the channels 28 being lower than the raised longitudinal portion 22. Hence, the raised longitudinal portion 22 forms a step acting as barrier against water infiltration, and the sloping thereof (sloping edge surface 22B) directs water to the vertical channels 28 for drainage. A vertical slot 29 is also concurrently defined by the blocks 10 in end to end connection, for the insertion of deflectors 15 therein.

The construction blocks 10 are typically manufactured as an integral piece using bonding techniques by which the insulating core 12 will be molded with the shells 13. According to one embodiment,
the insulating core 12 is made of polyurethane, having roughly 54% of isocyanate, for 46% polyol, for example. Other products may be used, or other appropriate proportions of isocyanate/polyol may be used as well. The polyurethane is may be injection-molded with an injection pressure of about 1500 Psi, to provide a piece having a density of about 2.5 pound/cubic foot.

Referring to Figs. 1 and 3, the outer shell 13A and the inner shell 13B are similar in construction to one another, whereby their components will be described jointly with reference numerals 30 to 33.

The shells 13 each have a core wall 30. The core wall 30 has the same length and height as the inner/outer surfaces of the insulating core 12. Therefore, the core walls 30 cover the inner and outer surfaces of the insulating core 12. A longitudinal shoulder 31 is provided on a top surface the core wall 30, while a longitudinal projection 32 is defined in the undersurface of the construction block 10, offset from the longitudinal shoulder 31. A longitudinal channel 33 (or longitudinal clearance) is defined inward of the longitudinal projection 32 in the undersurface, and is generally vertically aligned with the longitudinal shoulder 31.

Accordingly, when construction blocks 10 are assembled one on top of the other in the manner shown in 4, the longitudinal shoulders 31 are in complementary engagement with the longitudinal projections 32, while the longitudinal channels 33 remain unobstructed to enable ventilation and water circulation therethrough. The longitudinal channels 33 are in close proximity to the vertical channels 28 of the core 12, thereby concurrently forming drainage channels and ventilation passages, which network in on the outer side of the erected wall (i.e., rainscreen side). The geometry of the underside of the construction blocks 10 and the top
side thereof also results in a channel 34 defined at the sloping edge surface 22B, preferably only on the rainscreen side as shown in Fig. 4. The channel 34 is in fluid communication with the vertical channels 28, thereby forming a draining network therewith.

The shells 13 are made of concrete. One suitable formula of concrete comprises silicate sand, dyes, polymers, fiber material (about 4% for example), and water. It is considered to position a sheet between the insulating core 12 and shells 13. For instance, a low-density polyethylene sheet may be used, and may be pre-glued with a water-based adhesive. Any other suitable arrangement is considered.

As shown in Figs. 2, 8 and 9, the connector 14 includes the deflector 15 in an integrally molded monolithic piece, although the connector and the deflector could be separate parts. According to an embodiment, the connectors 14 may consist of a relatively rigid material such as metals or plastics. The density and rigidity of the connectors 14 is selected as a function of their structural function, namely interconnecting blocks 10.

As best seen in Fig. 8, the connectors 14 have an H-shaped portion 40 that will be received in the sets of T-sections 25 (Fig. 5) of blocks 10 in end to end arrangement. The connectors 14 further comprise a U-shaped portion 41 that will be received in the sets of L-sections 26 (Fig. 5) of blocks 10 in end to end arrangement, thereby forming additional vertical drainage channels in communication with the horizontal channel 34 (Fig. 4). The H-shaped portion 40 and the U-shaped portion 41 may be interconnected by an arm 42 to form an integral body of the connector 14. The geometry of the connector 14 is selected as a function of the shape of the connector slots 24, and may thus have a different shape to match that of the slots 24. An
additional arm 43 may project from the U-shaped portion 41 and have at its end the deflector 15. The additional arm 43 passes through the gap 27B.

It is observed from Fig. 9 that the top profile of the connector 14 slopes downwardly from the H-shaped portion 40 toward the deflector 15, effectively matching the top profile of the block 10. Accordingly, when the connector 14 is used to interconnect adjacent blocks in the manner shown in Fig. 5, the top of the connector 14 does not project beyond the top surface of the block 10, i.e., the connector 14 is concealed in the appropriate slots in the blocks 1410. Likewise, the bottom profile of the connector 14 is shaped to be concealed with the blocks 10 on the underside of the blocks 10, such that the blocks 10 may be stacked on one another in the manner shown in Fig. 4.

Referring to Fig. 10, there are illustrated corner construction blocks 10'. The corner construction blocks 10' are essentially similar in construction to the construction blocks 10, with one difference being that one end of each of the construction blocks 10' is beveled, to form a miter joint with an adjacent construction block 10'', as shown by beveled end faces 50. This may simply be achieved by cutting off the end of the construction blocks 10. The corner construction blocks 10' also feature vertical bores 51 adjacent the beveled end faces 50, bottom receptacles 52 (Fig. 13), and slots 53 open to the beveled end faces 50.

The bores 51 and receptacles 52 are defined in the corner construction blocks 10' for corner connectors 60 to interconnected adjacent blocks 10'. Referring to Fig. 11, a corner connector 60 is shown in greater details. The corner connector 60 has a pair of posts 61, interconnected by a bridge 62. In an embodiment, the corner connector 60 is a monolithic piece. According to an embodiment, the connectors 60 may
consist of a relatively rigid material such as metals or plastics. The posts 61 are shown as being tubular, with a raised rim portion 63 at a top. It is observed that a bottom of the posts 61 has a complementary shape and a finger 64, such that the connectors 60 may clip mate to one another when stacked, in the manner shown in Fig. 13. Hence, stacks of the connectors 60 are relatively stable, considering that the connectors 60 are structurally connected to the corner constructions 10' as well. It is observed from Fig. 13 that the posts 61 are inserted into vertical bores 51 of adjacent corner construction blocks 10' in such a way that the bridge 62 interconnects the adjacent corner construction blocks 10'.

When other layers are piled on top of a bottom layer, in the manner shown in Fig. 13, the bridges 62 are accommodated in the slots 53, receptacles 52. The part of the post 61 projecting above the plane of its respective corner construction block 10' (one of which is shown in Fig. 13, will project into the vertical bore 51 of the construction block 10' that will be laid on top of it. It is pointed out that Fig. 13 shows a connector 60 received in only one of the corner construction blocks 10', but this view is provided to illustrate the stacking of the connector 60 but does not actually represent an assembly step. As the posts 61 are tubular, a rod or grout may be inserted in a stack of posts 61 if desired, although not necessary. A deflector 70 (Fig. 10) may be inserted in the combined slots 53, to protect the channels 34. It is observed that the combined slots 53 may be oriented for the deflector 70 to slope toward the channel 34, to guide water to drainage.

Now that an example of the construction block 10 has been described, a method for assembling a dwelling with the construction block 10 and other
components of the construction system will be described, with reference initially to Figs. 5 and Fig. 76. Construction blocks 10 are positioned end to end as in Fig. 5, with the outer shells 13A being oriented to the outside of the dwelling. The base construction blocks 10, i.e., the bottom row of construction blocks 10, may be equipped with the leveling throughbores 20', for the leveling of the construction blocks 10.

More specifically, referring to Fig. 67, the throughbores 20' are used with bolts, screws or like mechanical fasteners that will level the construction block 10 longitudinally, i.e., relative to an axis that is perpendicular to the longitudinal direction of the construction blocks 10, and that lies in the plane of the page in Fig. 67. Moreover, the pair of throughbores 20' at one end will be used for the leveling of the construction block 10 about the longitudinal axis of the construction block 10. It may suffice to provide a pair of the throughbores 20' at a single one of the ends of the construction block 10 in the manner shown in Fig. 76, although a pair of the throughbores 20' could be used at both ends as well. Other arrangements are also contemplated. It is observed that the base block of Fig. 7 may not have drainage channels 28, as it may be desired that avoid water penetration below the base block 10. On the other hand, Fig. 6 shows an overblock that has the drainage channels 28, but none of the throughbores 20'.

Referring to Fig. 2, one of the connectors 14 is slid in engagement into the connector slots 24 of the end-to-end blocks 10, thereby interconnecting the blocks 10. In doing so, the deflector 15 of the connector 14 is slid in engagement into the vertical slots 29. As a result, the interconnected arrangement of is reached. Arriving at corners, the corner construction blocks 10' are used, along with the corner connectors 60 and
deflectors 70, in the manner described above. While the
deflector 70 is shown as being separate from the corner
connector 60, it may also be an integral monolithic piece.

A vertical dimension of a wall is defined by
assembling different rows of the construction block 10
one on top of the other. The overblocks, i.e., those
above the base row, may be construction blocks 10
without the throughbores 20', such as those shown in
Fig. 7. The construction blocks 10 are in vertical
alignment with one another in such a way that the
throughbores 20 (Fig. 3) of different rows are in
vertical register. This allows rods to be inserted into
throughbores 20 through the different rows of the
construction blocks 10. Such rods are long enough to
pass through numerous rows of construction block 10.
However, such rods may not be necessary. Once a first
row is formed, a second row of construction blocks 10 is
installed on top of the first row, with the junction
between end-to-end blocks 10 being preferably offset
from the junction of end-to-end blocks 10 of the first
row. Grout may also be inserted into empty columns of
throughbores 20. As mentioned previously, the
throughbores 20 are in vertical alignment, whereby the
grout that is inserted will pour down to lower
construction blocks 10. However, grout may not be
necessary.

The resulting wall therefore forms a rain
screen by the presence of the ventilation passages and
drainage channels in the manner described above,
operating under the rainscreen principle. At the
junction between blocks 10, the deflector 15 forms a
physical barrier against water infiltration, yet any gap
between the deflector 15 and the U-shaped portion 41 of
the connector 14 is ventilated by communication with the
network of channels 28 and 34. The U-shaped portion 41
then forms another physical barrier at the junction, inward of the channels 28. The H-shaped body 40 is yet another barrier at the junction between blocks 10, while the raised longitudinal portion 22 forms a physical barrier preventing water from passing between stacked construction blocks 10.
CLAIMS:

1. A block used as a building block in constructing a wall, comprising:
   a main body comprising an insulating core with
   a concrete inner shell member and a concrete outer shell
   member respectively covering inner and outer lateral
   surfaces of the insulating core;
   at least one drainage channel extending from
   top to bottom in the main body on the side of the
   concrete outer shell member; and
   upstanding slots at opposed ends of the main
   body defined to captively receive a connector for end to
   end engagement of a pair of the block.

2. The block according to claim 1, further
   comprising a raised longitudinal portion projecting
   upwardly from and extending along the main body from end
   to end of the block.

3. The block according to claim 2, further
   comprising a longitudinal channel in an underside of and
   extending along the main body from end to end of the
   block, the longitudinal channel having a shape
   complementary to that of the raised longitudinal portion
   for mating engagement when one of the block is stacked
   on another of the block.

4. The block according to any one of claims 2
   and 3, further comprising a sloping longitudinal portion
   between a top surface of the raised longitudinal portion
   and a flat longitudinal surface of the main body, at
   least on the side of the concrete outer shell member.

5. The block according to any one of claims
   2 to 4, wherein the at least one drainage channel has a
top open end in the main body positioned outwardly of the raised longitudinal portion.

6. The block according to any one of claims 1 to 5, further comprising a longitudinal clearance extending along the main body from end to end of the block, the longitudinal body being in fluid communication with the at least one drainage channel and forming a generally horizontal channel when one of the block is stacked on another of the block.

7. The block according to any one of claims 1 to 6, wherein the main body comprises at least one vertical throughbore for receiving a vertical structural member, the at least one vertical throughbore of one of the blocks being aligned with the at least one vertical throughbore of another of the blocks when the blocks are stacked on one another.

8. The block according to any one of claims 1 to 7, wherein each of the upstanding slots has at least a portion with a T-shaped sectional shape.

9. The block according to any one of claims 1 to 8, each of the upstanding slots has at least a portion with an L-shaped sectional shape.

10. The block according to any one of claims 1 to 9, wherein at least a portion of the upstanding slots is located outwardly of the at least one drainage channel.

11. The block according to any one of claims 1 to 10, further comprising an upper longitudinal shoulder extending along at least the concrete outer shell member end to end of the block, and a lower
longitudinal projection extending along at least the concrete outer shell member end to end of the block, the upper longitudinal shoulder being below a lowermost top surface of the main body while the lower longitudinal projection being below a lowermost bottom surface of the main body, the longitudinal shoulder and the longitudinal projection being in mating engagement when one of the block is stacked on another of the block.

12. An assembly for forming a wall, comprising:

a plurality of the block according to any one of claims 1 to 11; and

a plurality of connectors for interconnecting pairs of the block being positioned end to end.

13. The assembly according to claim 12, wherein each of the connectors has a first portion captively received in an end of one of the blocks of a pair, and a second portion captively received in an end of another of the blocks of a pair.

14. The assembly according to claim 13, wherein the connectors and the upstanding slots of respective pairs concurrently form a sliding joint for sliding the connectors into the respective pairs.

15. The assembly according to claim 14, wherein the sliding joint has a direction that is transverse to a longitudinal direction of the blocks.

16. The assembly according to any one of claims 12 to 15, wherein each of the connectors has an inner portion located inward of the at least one drainage channel and an outer portion located outward of the at least one drainage channel.
17. The assembly according to any one of claims 12 to 16, wherein each of the connectors has an H-shaped section, a U-shaped section, and an arm interrelating the H-shaped section to the U-shaped section.

18. The assembly according to any one of claims 12 to 17, wherein each of the connectors has a deflector portion transversely positioned in an intersection between interconnected pairs of the block, the deflector portion between located outward of the at least one drainage channel.

19. The assembly according to claim 18 when depending on claim 17, further comprising an arm between the deflector and the U-shaped section, whereby the deflector is integral with the connector in a monolithic piece.

20. A connector for connecting construction blocks, the connector comprising:
   a first post and a second post;
   a bridge connecting the first post to the second post; and
   a complementary mating configuration between a top surface of the first and second post, and a bottom surface of the first and second post, whereby one of the connector stacked on another of the connector are in mating engagement.

21. The connector according to claim 20, wherein the bridge is adjacent to the top surface of the first post and of the second post.

22. The connector according to any one of claims 20 and 21, wherein the complementary mating
configuration comprises a finger projecting downwardly from the first and second portion, and a corresponding receptacle open upwardly.

23. The connector according to any one of claims 20 to 22, wherein the first post and the second post are tubular members.
## INTERNATIONAL SEARCH REPORT

### A. CLASSIFICATION OF SUBJECT MATTER

IPC: **E04C 1/39** (2006.01), **E02D 29/02** (2006.01), **E04B 2/08** (2006.01), **E04C 1/00** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: E04C 1/39, E02D 29/02, E04B 2/08, E04C 1/00.

USPC: 52/605

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Questel-Orbit, Espacenet

Keywords: building, block, insulation, slot, connect, groove, channel, drain, flow.

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td><em>the whole document</em></td>
<td>8, 9, 17</td>
</tr>
<tr>
<td>Y</td>
<td>US1567085A (ROWLAND, V.) 29 December 1925 (29-12-1925) <em>the whole document</em></td>
<td>8, 9</td>
</tr>
<tr>
<td>X</td>
<td>US6189282B1 (VANDERWERF, P.) 20 February 2001 (20-02-2001) <em>the whole document</em></td>
<td>20, 21, 23</td>
</tr>
<tr>
<td>Y</td>
<td><em>the whole document</em></td>
<td>22</td>
</tr>
</tbody>
</table>

* Special categories of cited documents:
  - “A” document defining the general state of the art which is not considered to be of particular relevance
  - “E” earlier application or patent but published on or after the international filing date
  - “L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  - “O” document referring to an oral disclosure, use, exhibition or other means
  - “P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

Document member of the same patent family

Date of the actual completion of the international search:
29 October 2014 (29-10-2014)

Date of mailing of the international search report:
28 November 2014 (28-11-2014)

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage 1, C14 - 1st Floor, Box PCT
50 Victoria Street
Gatineau, Quebec K1A 0C9
Facsimile No.: 001-819-953-2476

Authorized officer

**Jeremy Garnet (819) 956-8721**
### INTERNATIONAL SEARCH REPORT

**Box No. II**  
**Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. **Claim Nos.:**  
   because they relate to subject matter not required to be searched by this Authority, namely:

2. **Claim Nos.:**  
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. **Claim Nos.:**  
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III**  
**Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

**Group A:** (claims 1-19) directed to a block used as a building block in constructing a wall, or an assembly of such blocks forming a wall.

**Group B:** (claims 20-23) directed to a connector for connecting construction blocks.

The connector of claims 20-23 is not necessarily required for the block, or assembly of blocks, of claims 1-19 since the connector relates to the connection of the corner blocks only. Therefore unity of invention is lacking.

1. ☑️ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☑️ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☑️ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos.:

4. ☑️ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos.:

**Remark on Protest**

☑️ The additional search fees were accompanied by the applicant=s protest and, where applicable, the payment of a protest fee.

☒ The additional search fees were accompanied by the applicant=s protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☒ No protest accompanied the payment of additional search fees.
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WO2010088777A1 (BOUCHARD, A.) 12 August 2010 (12-08-2010) <em>figures 1 and 34</em></td>
<td>1-19</td>
</tr>
<tr>
<td>Patent Document</td>
<td>Publication Date</td>
<td>Patent Family Member(s)</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FR28221 75A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FR28221 75B1</td>
</tr>
<tr>
<td>US1 567085A</td>
<td>29-12-1 925</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2057086A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP0544953A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PT99723A</td>
</tr>
<tr>
<td>US6189282B1</td>
<td>20-02-2001</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US655731 6B2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AT21 3042T</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU734930B2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU7524098A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BR9908609A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2286743A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2286743C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CN12552848A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CN1 103845C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE69803766D1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE69803766T2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP0991 826A2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP0991 826B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES21 7 1024T3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HU0001 932A2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HU0001 932A3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HU2241 83B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP2001152194A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JPA090327B2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NL1 005850C2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NZ500883A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PL336503A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PT991826E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RO1 19242B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RU21 75702C2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TR9902476T2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UA64749C2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US6282859B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W09848126A2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W09848126A3</td>
</tr>
<tr>
<td>WO201 0088777A1</td>
<td>12-08-2010</td>
<td>WO2010088777A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2748486A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2748486C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US20121 861 72A1</td>
</tr>
</tbody>
</table>