With the structure as disclosed in Canadian Patent 2,141,463 the connected panel sections required additional support and the panel sections were prone to deflection at intermediary positions, even if the rear face of the panel was supported.

It would be desirable to provide a concrete forming panel having the desirable characteristic of being assembled from a series of extrusions while providing a panel that is easy to assemble and is relatively stiff.

SUMMARY OF THE INVENTION

A concrete forming panel according to the present invention comprises at least first and second interlocking panel sections having a mechanical hinge connection joining the sections at an intermediate position extending in the length of the forming panel. The mechanical connection comprises a hook portion on the first panel received in a slot portion of a second panel and the mechanical connection includes a stop abutment of the hinge connection that is engaged when the panel sections are joined and aligned to form the forming face of the panel. The panel includes a series of brace members extending across the panel section on a rear surface thereof. Each brace member maintains engagement of any stop abutments and provides a rear support of the mechanical connection opposing deflection of the forming face towards the brace member.

In an aspect of the invention, the second panel below the slot includes a downwardly extending web member having a distal end thereof in engagement with the series of brace members to provide the rear support of the mechanical connection.

In a further aspect of the invention, the downwardly extending web member includes a bead portion at the distal end in engagement with the series of braces.

In a further aspect of the invention, the panel includes on either side of the length thereof, downwardly extending side rails and each of the series of brace members extend between and are secured to the side rails.

In a further aspect of the invention, the side rails include an inwardly extending flange portion, and the inwardly extending flange portion supports the brace members at opposite ends thereof.

In a further aspect of the invention, the brace members have an interference fit between said side rails and any of the bead portions maintaining the panel in an assembled configuration.

In a preferred aspect of the invention, the forming panel includes at least a third panel section connected as an intermediary between the first and second panel sections.

In yet a further aspect of the invention, a pair of end rails close opposed ends of the concrete forming panel and are secured to the at least two panel sections.

In yet a further aspect of the invention, the brace members are tubular extrusion members fixedly secured to the side rails.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are shown in the drawings, wherein:

With the structure as disclosed in Canadian Patent 2,141,463 the connected panel sections required additional support and the panel sections were prone to deflection at intermediary positions, even if the rear face of the panel was supported.

It would be desirable to provide a concrete forming panel having the desirable characteristics of being assembled from a series of extrusions while providing a panel that is easy to assemble and is relatively stiff.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, there is provided a concrete forming panel comprising at least first and second interlocking panel sections; the sections having a mechanical hinge connection joining the sections at an intermediate position extending in a length or width of the forming panel; the mechanical connection comprising a hook portion on the first panel received in a slot portion of the second panel and including a lip that forms a stop abutment of the hinge connection and that is engaged when the panel sections are joined by the hinge connection and aligned to form a planar forming face; wherein the concrete forming panel includes a series of brace members extending across the panel sections on a rear surface thereof, each brace member maintaining engagement of the stop abutment and providing a rear support of the mechanical connection opposing deflection of the forming face towards the brace member; wherein the second panel below the slot includes a downwardly extending web member having a bead portion at a distal end thereof, the bead portion being in engagement with the series of brace members to provide the rear support of the mechanical connection; wherein

the first panel includes a downwardly extending first side rail, the second panel includes a downwardly extending second side rail, and each brace member of the series of brace members extends between the first and second side rails; and wherein the first side rail includes an inwardly extending first flange, the second side rail includes an inwardly extending second flange, the first and second flanges extend toward one another, and the first and second flanges support the brace members at opposite ends of the brace members, such that the concrete forming panel exhibits a smooth forming surface.

In a preferred embodiment, the downwardly extending web member includes a bead portion at the distal end in engagement with the series of braces.

In another preferred embodiment, the panel includes on either side of the length thereof, downwardly extending side rails and each of the series of brace members extend between and are secured to the side rails.

In a further preferred embodiment, the side rails include an inwardly extending flange portion, and the inwardly extending flange portion supports the brace members at opposite ends thereof.

In yet a further preferred embodiment, the brace members have an interference fit between the side rails and any of the bead portions maintaining the panel in an assembled configuration.

In a further preferred embodiment, the forming panel includes at least a third panel section connected as an intermediary between the first and second panel sections.

In yet a further preferred embodiment, a pair of end rails close opposed ends of the concrete forming panel and are secured to the at least two panel sections.

In a further preferred embodiment, the brace members are tubular extrusion members fixedly secured to the side rails.

In yet a further preferred embodiment, the tubular members are of a trapezoidal shape cross section.

In a further preferred embodiment, the interlocking panel sections are aluminum extrusions.

In yet a further preferred embodiment, each brace member of said series of brace members has a first surface in contact with the bead portion, and a second surface, opposite the first surface, partially in contact with each of the first and second flanges.

In a further preferred embodiment, each brace member has an interference fit between the bead portion and the first and second flanges, and said series of brace members lock said first panel and said second panel together while maintaining alignment to define said planar forming face of the concrete forming panel.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are shown in the drawings, wherein:

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A concrete forming panel comprising at least first and second interlocking panel sections having a mechanical hinge connection joining said sections at an intermediate position extending in a length or width of said forming panel;

said mechanical connection comprising a hook portion on said first panel received in a slot portion of said second panel and including a stop abutment of said hinge connection that is engaged when said panel sections are joined by said hinge connection and aligned to form said forming face; and

wherein said panel includes a series of brace members extending across said panel sections on a rear surface thereof, each brace member maintaining engagement of said stop abutment and providing a rear support of said mechanical connection opposing deflection of said forming face towards said brace member.

2. A concrete forming panel as claimed in claim 1 wherein said second panel below said slot includes a downwardly extending web member having a distal end thereof in engagement with said series of brace members to provide said rear support of said mechanical connection.

3. A concrete forming panel as claimed in claim 2 wherein said downwardly extending web member includes a bead portion at said distal end in engagement with said series of brace members.

4. A concrete forming panel as claimed in claim 3 wherein said panel includes either side of the length thereof downwardly extending side rails and each of said series of brace members extend between and are secured to said side rails.

5. A concrete forming panel as claimed in claim 4 wherein each of said side rails include an inwardly extending flange portion and said inwardly extending flange portions supports said brace members at opposite ends thereof.

6. A concrete forming panel as claimed in claim 5 wherein said brace members have an interference fit between said side rails and any of said bead portions.

7. A concrete forming panel as claimed in claim 1 wherein said forming panel includes a third panel section connected as an intermediary between said first and second panel sections.

8. A concrete forming panel as claimed in claim 6 including a pair of end rails closing opposed ends of said concrete forming panel and secured to said at least two panel sections.

9. A concrete forming panel as claimed in claim 8 wherein said end rails are secured by a series of welds.

10. A concrete forming panel as claimed in claim 8 wherein said brace members are tubular extrusion members fixedly secured to said side rails.

11. A concrete forming panel as claimed in claim 2 wherein a base of said slot of said second panel section and the downwardly extending web member having a bead portion at an end thereof form a stiff load transmitting structure having a top flange, a connecting web and a bottom flange.

12. A concrete forming panel as claimed in claim 10 wherein said tubular members are of a trapezoidal shape cross section.

CLAIMS:

1. A concrete forming panel comprising

at least first and second interlocking panel sections;

the sections having a mechanical hinge connection joining said sections at an intermediate position extending in a length or width of said forming panel;

said mechanical connection comprising a hook portion on said first panel received in a slot portion of said second panel and including a lip that forms a stop abutment of said hinge connection and that is engaged when said panel sections are joined by said hinge connection and aligned to form a planar forming face;

wherein said concrete forming panel includes a series of brace members extending across said panel sections on a rear surface thereof, each brace member maintaining engagement of said stop abutment and providing a rear support of said mechanical connection opposing deflection of said forming face towards said brace member;

wherein said second panel below said slot includes a downwardly extending web member having a bead portion at a distal end thereof, said bead portion being in engagement with said series of brace members to provide said rear support of said mechanical connection;

wherein said first panel includes a downwardly extending first side rail, said second panel includes a downwardly extending second side rail, and each brace member of said series of brace members extends between said first and second side rails; and

wherein said first side rail includes an inwardly extending first flange, said second side rail includes an inwardly extending second flange, said first and second

flanges extend toward one another, and said first and second flanges support said brace members at opposite ends of said brace members, such that the concrete forming panel exhibits a smooth forming surface.

2. A concrete forming panel as claimed in claim 1 wherein said brace members have an interference fit between said side rails and said bead portion.

3. A concrete forming panel as claimed in claim 1 wherein said forming panel includes a third panel section connected as an intermediary between said first and second panel sections.

4. A concrete forming panel as claimed in claim 2 including a pair of end rails closing opposed ends of said concrete forming panel and secured to said at least two panel sections.

5. A concrete forming panel as claimed in claim 4 wherein said end rails are secured by a series of welds.

6. A concrete forming panel as claimed in claim 4 wherein said brace members are tubular extrusion members fixedly secured to said side rails.

7. A concrete forming panel as claimed in claim 1 wherein a base of said slot of said second panel section and the downwardly extending web member having a bead portion at an end thereof form a stiff load transmitting structure having a top flange, a connecting web and a bottom flange.

8. A concrete forming panel as claimed in claim 6 wherein said tubular members are of a trapezoidal shape cross section.

9. A concrete forming panel as claimed in claim 1 wherein said interlocking panel sections are aluminum extrusions.

10. A concrete forming panel as claimed in claim 1 wherein each brace member of said series of brace members has a first surface in contact with the bead portion, and a second surface, opposite the first surface, partially in contact with each of the first and second flanges.

11. A concrete forming panel as claimed in claim 10, wherein each brace member has an interference fit between the bead portion and the first and second flanges, and said series of brace members lock said first panel and said second panel together while maintaining alignment to define said planar forming face of the concrete forming panel.