Aug. 18, 1970 T. J. BOTTOM 3,524,292

INTERLOCKING PANEL ASSEMBLY

Filed Feb. 7, 1968

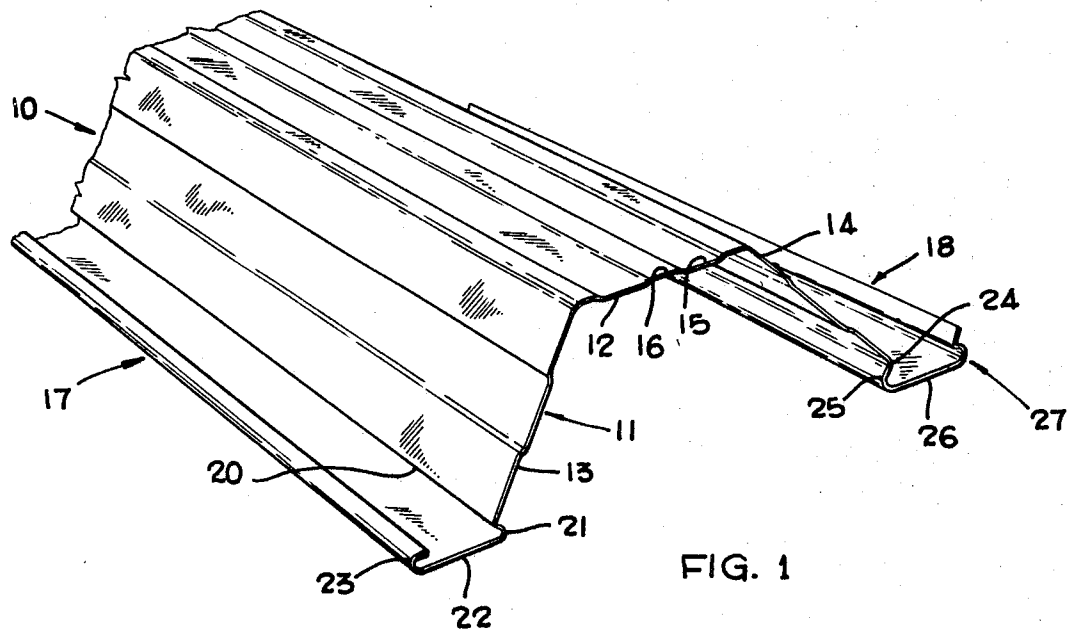


FIG. 1

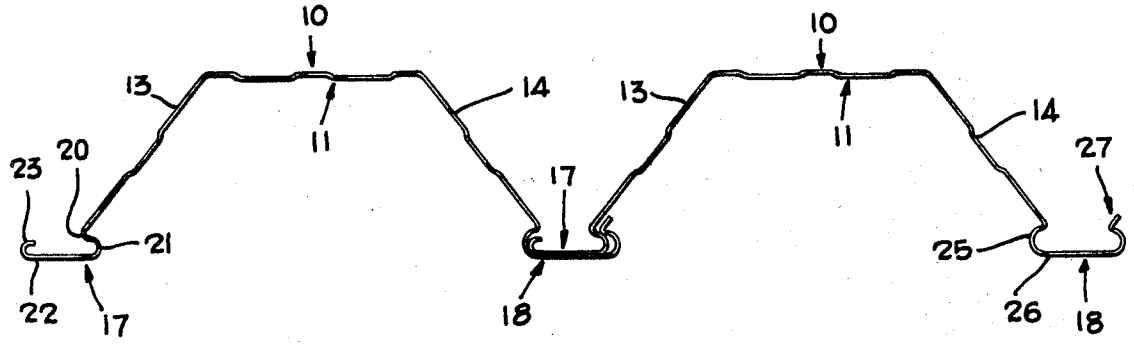


FIG. 2

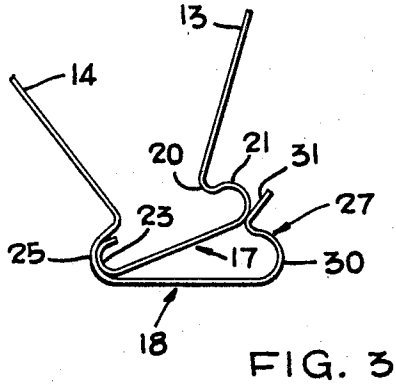


FIG. 3

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United States Patent Office 3,524,292 Patented Aug. 18, 1970

3,524,292

INTERLOCKING PANEL ASSEMBLY

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Filed Feb. 7, 1968, Ser. No. 703,615
Int. Cl. E04d 1/18, 3/363
U.S. Cl. 52—522 4 Claims

ABSTRACT OF THE DISCLOSURE

A panel assembly having a plurality of interconnected panels. Each panel includes a first flange and a second flange at opposite sides. The first flange of each panel has an arcuate portion and an oppositely disposed, curved portion. The second flange has an arcuate portion and an oppositely disposed, substantially S-shaped portion. The first flange of each panel snaps into the second flange of the next adjacent panel. In connecting coacting first and second flanges, the curved end portion of the first flange enters and bears against the arcuate bearing portion of the second flange, while the arcuate portion of the first flange cams or springs the resilient, substantially S-shaped portion of the second flange by bearing against an inclined tab, and moves into an arcuate hook portion. The substantially S-shaped portion of the second flange resiliently embraces the arcuate portion of the first flange, thereby effectively attaching the coacting flanges and adjacent panels. The resilient, substantially S-shaped portion underlies the second flange and body of the adjacent panel and accordingly, because access is prohibited, unintentional or accidental disconnection of the panels is prevented.

BACKGROUND OF THE INVENTION

This invention relates generally to improvements in an interlocking panel assembly, and more particularly to an improved connection between adjacent associated panels, and to an improved panel construction.

One type of prior panel assembly incorporated an interlocking side connection which required the individual adjacent panels to be initially located in substantially end-to-end relation to align tongue and groove structure, and then required such panels to be slidably moved in an endwise direction for connection in side-by-side relation. Another type of panel assembly incorporated an interfitting tongue and groove structure that did not positively interlock per se, and therefore the associated panels could be simply separated. Still another interlocking tongue and groove structure did not permit a quick snap connection, and therefore, did not realize quick panel assembly, but rather, required a relatively slower, time-consuming procedure. Many of the prior panel assemblies required the fastening of component parts of the panels to the frame on which the panel assembly was mounted in order to retain the panels in interlocked assembly.

In any event, the prior structures did not achieve a panel assembly in which the adjacent panels were positively interlocked and in which the panels could still be quickly and easily assembled by simply placing the panels successively in side-by-side relation.

SUMMARY OF THE INVENTION

The present panel assembly incorporates panels of identical construction which can be readily interlocked and assembled by snapping together coacting side flanges of adjacent associated panels. The positive connection is

achieved automatically during the act of placing successive adjacent panels in side-by-side relation, without the need for auxiliary fastening devices.

Each panel includes a body having a first flange at one side and a second flange at the opposite side, the first flange of each panel snapping into an interfitting second flange of the next adjacent panel. The first flange has an arcuate portion and an oppositely disposed, curved end portion. The second flange has an arcuate bearing portion and an oppositely disposed, substantially S-shaped portion that is resiliently yieldable.

In connecting coacting flanges of associated adjacent panels, the curved end portion of the first flange enters and bears against the arcuate portion of the second flange, the curvature radius of the curved end portion being less than that of the arcuate bearing portion. The arcuate portion of the first flange engages an inclined tab of the substantially S-shaped portion of the second flange, the distance between the arcuate portion and end portion of the first flange being greater than the distance between the arcuate bearing portion and tab of the second flange. Upon continued swinging movement of one panel relative to the other, incident to alignment of the panels on a supporting surface or frame, the resilient substantially S-shaped portion will spring outwardly to admit the arcuate portion of the first flange into the arcuate hook portion of the substantially S-shaped portion. During this camming action, the curved end portion of the first flange bears and pivots upon the arcuate bearing portion of the second flange.

When connected, the hook portion of the second flange snaps over and embraces the arcuate portion of the first flange for a positive attachment. To attain this advantageous result, the curvature radius of the arcuate portion of the first flange is less than of the hook portion, and the distance between the arcuate portion and end portion, of the first flange is less than that between the arcuate bearing portion and the hook portion of the second flange.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary, perspective view of a panel;
FIG. 2 is an end view of two interlocked panels, and
FIG. 3 is an enlarged end view of coacting flanges of adjacent panels just prior to positive attachment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now by characters of reference to the drawing, and first to FIG. 1, it will be apparent that each panel **10** of the panel assembly is identical in structure so that a detailed description of one will suffice for each other.

The panel **10** is constructed of sheet metal and includes an elongate body **11**. The body **11** is of inverted, substantially U-shape having a top wall **12** and integral, depending and divergent side walls **13** and **14**. The walls **12–14** of body **11** are provided with alternately arranged elongate channels **15** and ribs **16** for strength.

Extending laterally from and formed integrally with the side wall **13**, is a first flange, referred to by **17**. A second flange indicated by **18** is formed integrally with and extends laterally from the side wall **14**. The first and second flanges **17** and **18** are located on opposite sides of the panel body **11**.

The first flange **17** includes a revesely bent portion **20** extending integrally from the side wall **13** of body **11**, the reversely bent portion **20** turning inwardly toward the second flange **18**. An arcuate portion **21** extends integrally from the reversely bent portion **20** and turns laterally out-

ward. Extending integrally from and connected by an intermediate web **22**, is a curved end portion **23**. The curved end portion **23** and arcuate portion **21** are disposed in oppositely facing relation.

For reasons which will later appear, the curvature radius of the curved end portion **23** of the first flange **17** is less than the curvature radius of the arcuate portion **21**.

The second flange **18** includes a reversely bent portion **24** extending integrally from the side wall **14** of panel body **11**, the reversely bent portion **24** turning inwardly toward the first flange **17**. An arcuate bearing portion **25** extends integrally from the reversely bent portion **24**, and turns laterally outward. Integrally interconnected to the arcuate bearing portion **25** by an intermediate web **26**, is a substantially S-shaped portion, generally indicated by **27**. As is best shown in FIG. 3, the substantially S-shaped portion **27** consists of an arcuate hook portion **30** disposed opposite the arcuate bearing portion **25**, and an outwardly inclined tab **31** extending integrally from the hook portion **30**.

For reasons which will later appear, the curvature radius of the curved end portion **23** of the first flange **17** is less than the curvature radius of the arcuate bearing portion **25** of the second flange **18**. Moreover, the curvature radius of the arcuate portion **21** of the first flange **17** is less than the curvature radius of the arcuate hook portion **30** of the second flange **18**.

Another structural relationship existing is that the distance between the arcuate portion **21** and curved end portion **23** of the first flange **17** is greater than the distance between the arcuate bearing portion **25** and the tab **31** of the second flange **18**, yet such distance is less than the distance between the arcuate bearing portion **25** and the hook portion **30** of the second flange **18**.

With the described structure of flanges **17** and **18**, when the first flange **17** of one panel **10** is inserted into the second flange **18** of an associated adjacent panel **10**, the curved end portion **23** of the first flange **17** will bear against the arcuate portion **25** of the second flange **18**, while the arcuate portion **21** of the first flange **17** bears against and engages the tab **31**. Upon continued swinging movement of the first flange **17**, the curved end portion **23** pivots on the arcuate portion **25**, and the arcuate portion **21** cams the resilient, substantially S-shaped portion **27** outwardly until the arcuate portion **21** clears the tab **31**. At which time, the arcuate portion **21** enters into the hook portion **30** and the substantially S-shaped portion **27** springs back so that the hook portion **30** snaps over the arcuate portion **21** to interlock the flanges **17** and **18** securely.

It is thought that the functional advantages of the panel assembly have become fully apparent from the foregoing detail and description of parts, but for completeness of disclosure, the assembly of the panel will be briefly described. While the interlocking connection of only two adjacent panels **10** is described in detail, it will be understood that the interlocking connection of each successive adjacent panel will be identical.

It will be assumed that one panel **10** is located with its flanges **17** and **18** resting on a supporting, subjacent surface.

First, another panel **10** is located in side-by-side relation with its first flange **17** overlying the second flange **18** of the associated panel. Then such panel is tilted so that the curved end portion **23** of the first flange **17** can be inserted into the flange **18** and specifically into engagement with the arcuate bearing portion **25** of the second flange **18**. As the panel **10** is swung downwardly to bring the associated panels **10** into alignment, the arcuate portion **21** of the first flange **17** engages the inclined tab **31** of the substantially S-shaped portion **27** of the second flange **18**. Upon continued swinging movement of the panel **10**, the arcuate portion **21**, bearing on the inclined portion **31**, cams the resilient substantially S-shaped portion **27** outwardly. During this camming action, the curved end portion **23** of the first flange **17** bears pivotally against the arcuate bearing portion **25**. When the substantially S-shaped portion **27** is sprung sufficiently, the arcuate portion **21** will snap into the hook portion **30** of the substantially S-shaped portion **27**. The resilient, substantially S-shaped portion **27** springs back to its initial unsprung position, whereby the hook portion **30** snaps over and engages the arcuate portion **21** of the first flange **17**. The coacting flanges **17** and **18** are then effectively interfitted and interlocked.

The positive connection between adjacent associated panels **10** is achieved automatically during the act of placing successive adjacent panels **10** in side-by-side relation, without the need for auxiliary fastening devices. The coacting flanges **17** and **18** of such adjacent panels **10** are interfitted, and by pivotally swinging one panel **10** relative to the other panel **10**, the coacting flanges **17** and **18** are snapped together for positive interlocking connection. Because the substantially S-shaped portion **27**, which incorporates the hook portion **30**, is a part of the second flange **18** underlying the coacting flange **17**, the substantially S-shaped portion **27** is not readily accessible from the top of the assembled panels, and therefore unintentional or accidental disconnection of the associated panels is precluded.

Although the invention has been described by making detailed reference to a single preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. A panel comprising:

(a) an elongate body having a first flange at one side and a second flange at the opposite side,

(b) the first flange including:

(1) a reversely bent portion extending from the body and turning inwardly toward the second flange,

(2) an arcuate portion extending from the reversely bent portion and turning laterally outward, and

(3) a curved end portion extending from and disposed opposite the arcuate portion, the arcuate portion and end portion being connected by an intermediate web,

(c) the second flange including:

(1) a reversely bent portion extending from the body and turning inwardly toward the first flange,

(2) an arcuate bearing portion extending from the last said reversely bent portion and turning latally outward, and

(3) a substantially S-shaped portion providing an arcuate hook portion extending from and disposed opposite the last said arcuate portion, and providing an outwardly inclined tab extending from the hook portion, the substantially S-shaped portion and the last said arcuate portion being connected by an intermediate web,

(d) the distance between the arcuate portion and end portion of the first flange being less than the distance between the arcuate bearing portion and the hook portion of the second flange, and

(e) the curvature radius of the curved end portion of the first flange being less than the curvature radius of the arcuate bearing portion of the second flange.

2. A panel comprising:

(a) an elongate body having a first flange at one side and a second flange at the opposite side,

(b) the first flange including:

(1) a reversely bent portion extending from the body, and turning inwardly toward the second flange,

(2) an arcuate portion extending from the reversely bent portion and turning laterally outward, and

(3) a curved end portion extending from and disposed opposite the arcuate portion, the arcuate portion and end portion being connected by an intermediate web,

(c) the second flange including:

(1) a reversely bent portion extending from the body and turning inwardly toward the first flange,

(2) an arcuate bearing portion extending from the last said reversely bent portion and turning laterally outward, and

(3) a substantially S-shaped portion providing an arcuate hook portion extending from and disposed opposite the last said arcuate portion, and providing an outwardly inclined tab extending from the hook portion, the substantially S-shaped portion and the last said arcuate portion being connected by an intermediate web,

(d) the distance between the arcuate portion and the end portion of the first flange being greater than the distance between the arcuate bearing portion and tab of the second flange, yet being less than the distance between the arcuate bearing portion and hook portion of the second flange,

(e) the curvature radius of the curved end portion of the first flange being less than the curvature radius of the arcuate portion of the same first flange,

(f) the curvature radius of the curved end portion of the first flange being less than the curvature radius of the arcuate bearing portion of the second flange, and

(g) the curvature radius of the arcuate portion of the first flange being less than the curvature radius of the arcuate hook portion of the second flange.

3. A panel assembly comprising:

(a) a plurality of interconnected, elongate panels,

(b) each panel including:

(1) a body having a first flange at one side and a second flange at the opposite side,

(2) the first flange including:

(I) a reversely bent portion extending from the body and turning inwardly toward the second flange,

(II) an arcuate portion extending from the reversely bent portion and turning laterally outward, and

(III) a curved end portion extending from and disposed opposite the arcuate portion, the arcuate portion and end portion being connected by an intermediate web,

(3) the second flange including:

(I) a reversely bent portion extending from the body and turning inwardly toward the first flange,

(II) an arcuate bearing portion extending from the last said reversely bent portion and turning laterally outward, and

(III) a substantially S-shaped portion providing an arcuate hook portion extending from and disposed opposite the last said arcuate portion, and providing an outwardly inclined tab extending from the hook portion, the substantially S-shaped portion and the last said arcuate portion being connected by an intermediate web,

(c) the first flange of each panel snapping into and interfitting the second flange of the next adjacent panel,

(d) the distance between the arcuate portion and the end portion of the first flange of each panel being less than the distance between the arcuate bearing portion and hook portion of the second flange, so that the arcuate portion and end portion of the first flange of each panel is received in the arcuate bearing portion and hook portion respectively of the

second flange of the next adjacent panel when the coacting flanges are snapped together, and

(e) the curvature radius of the curved end portion of the first flange of each panel being less than the curvature radius of the arcuate bearing portion of the coacting second flange of the next adjacent panel so as to bear pivotally thereagainst as the resilient, substantially S-shaped portion of the second flange yields upon snapping the first flange into the second flange, and so that the curved end portion of the first flange is received within the arcuate bearing portion of the coacting second flange when the first and second flanges are snapped together.

4. A panel assembly comprising:

(a) a plurality of interconnected, elongate panels,

(b) each panel including:

(1) a body having a first flange at one side and a second flange at the opposite side,

(2) the first flange including:

(I) a reversely bent portion extending from the body and turning inwardly toward the second flange,

(II) an arcuate portion extending from the reversely bent portion and turning laterally outward, and

(III) a curved end portion extending from and disposed opposite the arcuate portion, the arcuate portion and end portion being connected by an intermediate web.

(3) the second flange including:

(I) a reversely bent portion extending from the body inwardly toward the first flange,

(II) an arcuate bearing portion extending from the last said reversely bent portion and turning laterally outward, and

(III) a substantially S-shaped portion providing an arcuate hook portion extending from and disposed opposite the last said arcuate portion, and providing an outwardly inclined tab extending from the hook portion, the substantially S-shaped portion and the last said arcuate portion being connected by an intermediate web,

(c) the first flange of each panel snapping into and interfitting the second flange of the next adjacent panel,

(d) the distance between the arcuate portion and the end portion of the first flange of each panel being greater than the distance between the arcuate bearing portion and tab of the second flange of the next adjacent panel so that the arcuate portion of the first flange bears against the inclined tab of the second flange and resiliently spreads the substantially S-shaped portion of the second flange as the curved end portion of the first flange pivotally bears on the arcuate bearing portion of the second flange upon snapping the first flange into the second flange, and yet such distance between the arcuate portion and end portion of the first flange being less than the distance between the arcuate bearing portion and hook portion of the second flange so that the arcuate portion of the first flange is received in the hook portion of the second flange the curved end portion of the first flange is received in the arcuate bearing portion of the second flange, and

(e) the curvature radius of the curved end portion of the first flange being less than the curvature radius of the arcuate portion of the same first flange,

(f) the curvature radius of the curved end portion of the first flange being less than the curvature radius of the arcuate bearing portion of the second flange so that the curved end portion bears pivotally on the arcuate bearing portions as the first flange is snapped into the second flange, and

(g) the curvature radius of the arcuate portion of the first flange being less than the curvature radius of the arcuate hook portion of the second flange so that the arcuate hook portion retentively receives the arcuate portion of the first flange when the flanges have been snapped together.

References Cited

UNITED STATES PATENTS

3,241,284	3/1966	Gregoire	52—522 X
3,293,819	12/1966	Heirich	52—588 X

FOREIGN PATENTS

910,110 11/1962 Great Britain.

OTHER REFERENCES

288,724, March 1965, Netherlands application, 3 sheets of Drawing only.

ALFRED C. PERHAM, Primary Examiner

U.S. Cl. X.R.

52—536, 588