Aug. 2, 1966 E. J. DE RIDDER 3,264,020

JOINT CONSTRUCTION

Filed May 4, 1961

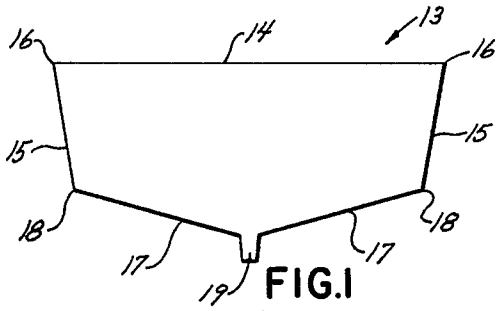


FIG.1

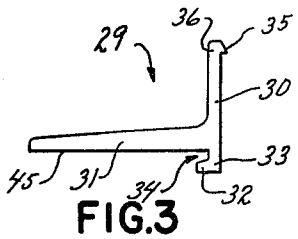


FIG.3

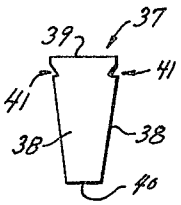


FIG.4

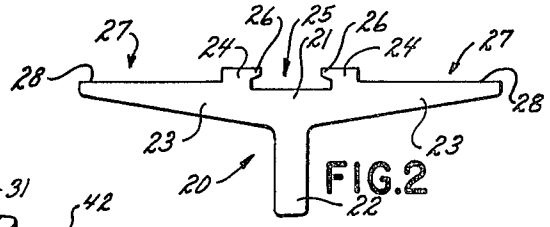


FIG.2

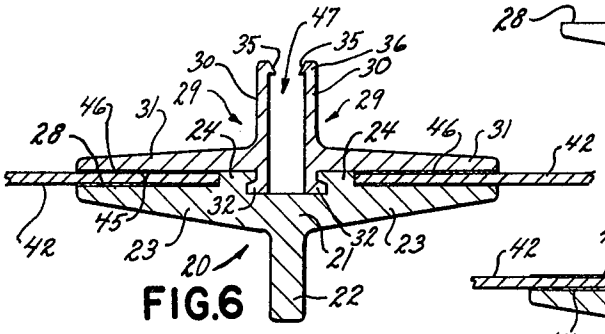


FIG.6

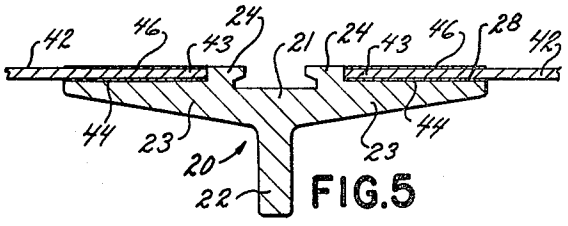


FIG.5

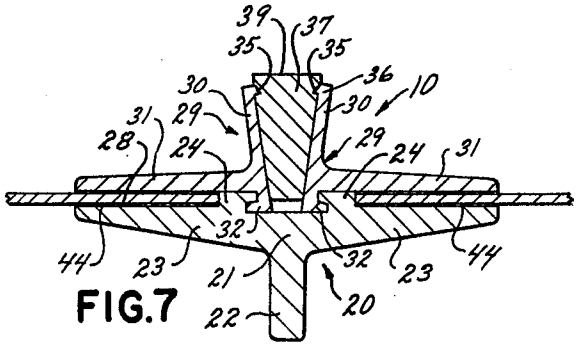


FIG.7

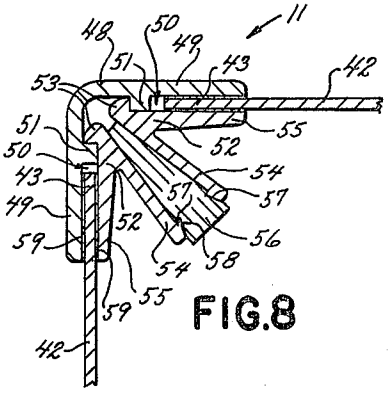


FIG.8

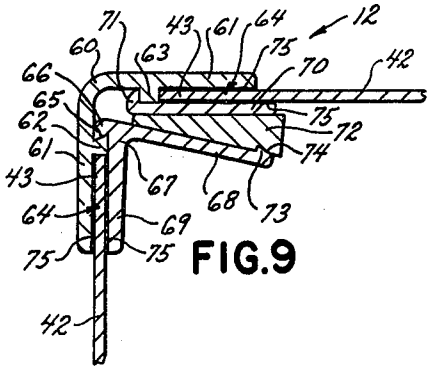


FIG.9

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JOINT CONSTRUCTION

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10 Claims. (Cl. 287—189.36)

This invention relates to improved joint constructions and to improved methods for making the same or the like. This invention also relates to improved members for such joint constructions or the like.

In particular, each joint construction of this invention includes a first joint member having a pair of sheet-receiving channels provided therein and respectively receiving adjacent ends of a pair of sheets or the like to be subsequently interconnected together whereby one side of the sheets is disposed in engagement with the first joint member.

A pair of second joint members are operatively interconnected to the first joint member intermediate the channels thereof, the second joint members defining a slot therebetween and respectively engaging the other sides of the sheets.

A wedge-like member is inserted or driven into the slot between the second joint members and causes the second joint members to compress the ends of the sheets against the first joint member to complete the joint construction and hold the ends of the sheets in a fixed position relative to each other.

If desired, suitable adhesive means can be disposed between the mating surfaces of the joint members and the sheets to further secure the sheets together and/or provide a moisture-proof joint construction.

Accordingly, it is an object of this invention to provide an improved joint construction having one or more of the novel features set forth above or hereinafter shown or described.

Another object of this invention is to provide an improved joint member for such a joint construction or the like.

Another object of this invention is to provide an improved method for making such a joint construction or the like.

Other objects, uses and advantages of this invention are apparent from a reading of this description, which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a front schematic view of a typical hull construction of a boat or the like.

FIGURE 2 is an end view of one of the joint members of this invention.

FIGURE 3 is a view similar to FIGURE 2 and illlustrates another joint member of this invention.

FIGURE 4 is an end view of a wedge-like member of this invention for forming certain of the joint constructions of this invention.

FIGURE 5 is an axial, cross-sectional view illustrating one of the initial steps of forming one of the joint constructions of this invention.

FIGURE 6 is a view similar to FIGURE 5 and illustrates the manner of assembling the joint members of FIGURE 3 to the assembly of FIGURE 5.

FIGURE 7 is a view similar to FIGURE 6 and illustrates the joint construction of FIGURE 6 in its completed condition.

FIGURE 8 is an axial, cross-sectional view illustrating another joint construction of this invention.

FIGURE 9 is a view similar to FIGURE 8 and illustrates still another joint construction of this invention.

While the joint constructions and methods of this invention are illustrated and hereinafter described as

being particularly adaptable for forming joint constructions for boats or the like, it is to be understood that such joint constructions and methods can be utilized for other purposes, as desired. For example, such joint constructions and methods can be readily utilized in the container art, for forming truck and trailer bodies, for use in the building industry, and the like.

Therefore, this invention is not to be limited to the specific applications thereof illustrated in the drawings, as the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURES 7, 8 and 9, the reference numerals **10**, **11** and **12** respectively indicate various joint constructions of this invention formed of parts and by methods of this invention in a manner hereinafter described.

Such joint constructions **10**, **11** and **12** can be readily utilized in forming the joint structure of a hull **13**, FIGURE 1, of a conventional boat or the like.

In particular, the hull **13** is formed by joining the top plates or deck **14** to plate-like sides **15** at the corner or sheet joints **16**. Similarly, the plate-like bottom halves **17** of the hull **13** are joined to the side plates **15** at the corner or chine joints **18**. In addition, the plate-like bottom halves **17** of the hull **13** are joined together at adjacent end edges thereof at the keel **19** of the hull **13**.

While the hull **13** can be formed of any suitable material and in any suitable manner, the joint structure at the corners **16** and **18** thereof can be formed in the manner illustrated in FIGURES 8 and 9, while the joint structure at the keel **19** can be formed in the manner illustrated in FIGURE 7.

The keel joint structure **19** and method of making the same will now be described.

As illustrated in FIGURE 2, a first joint member **20** of this invention can be formed in any suitable manner and of any suitable material, and, in the embodiment illustrated in the drawings, the joint member **20** is formed from aluminum-containing metallic material or the like extruded in a conventional extruding apparatus.

The joint member **20** comprises a body portion **21** having a keel-like flange **22** extending downwardly therefrom and a pair of like legs **23** extending outwardly therefrom in opposite directions, the legs **23** being disposed at any desired angle relative to each other to conform to the bottom configuration of a particular boat hull utilizing the same. For example, the joint member **20** illustrated in the drawings is utilized for forming the keel joint structure of a flat bottom boat or the like.

Each leg **23** of the joint member **20** has a flange **24** extending outwardly therefrom and spaced from the other flange **24** to define a chamber **25** therebetween. Each flange **24** has an outwardly extending projection **26** on the outer end thereof facing toward the projection **26** on the other flange **24** for a purpose hereinafter described.

The flanges **24** cooperate with their respective legs **23** to define plate or sheet-receiving channels **27** therewith, the channels **27** defining upper surfaces **28** of the legs **23** of the joint member **20**.

A pair of second joint member **29**, FIGURE 3, are adapted to be operatively interconnected to the joint member **20** in a manner hereinafter described to form the joint construction **10** of this invention. While the joint members **29** can be formed in any suitable manner and of any suitable material, the joint members **29** are formed by extruding aluminum-containing metallic material or the like in a conventional extruding apparatus in a manner well known in the art.

Each joint member **29** comprises a pair of legs **30** and **31** integrally interconnected together and disposed at any desired angle relative to each other.

The leg **30** of each joint member **29** has an outwardly

extending projection **32** on one end **33** thereof which cooperates with the leg **31** to define a channel **34** therewith, the projection **32** being adapted to hook around a projection **26** on one of the flanges **24** of the joint member **20** in a manner hereinafter described.

A hooked-shaped projection **35** is integrally interconnected to the other end **36** of the leg **30** of each joint member **29** and is utilized for a purpose hereinafter described.

A wedge-like member **37** is illustrated in FIGURE 4 and is utilized to complete the joint construction **10** in a manner hereinafter described. While the wedge-like member **37** can be formed of any suitable material and in any suitable manner, the embodiment of the wedge-like member **37** illustrated in the drawings is formed from aluminum-containing metallic material or the like extruded in a conventional extruding apparatus.

The wedge-like member **37** has a pair of angularly disposed sides **38** and a pair of opposed ends **39** and **40**. Each side **38** of the wedge-like member **37** is provided with a recess **41** adjacent the larger end **39** thereof to cooperate with the hooked-shaped projections **35** of the joint members **29** in a manner hereinafter described.

When it is desired to interconnect together adjacent plate-like or sheet-like members **42**, FIGURE 5, by the joint construction **10** to form the bottom of the hull **13** or the like, the adjacent ends **43** of the sheets **42** are disposed in the channels **27** of the joint member **20** in the manner illustrated in FIGURE 5. If desired, suitable layers of adhesive **44** can be interposed between the mating surfaces of the sheets **42** and the joint member **20** by either applying the adhesive to the sheets **42** or to the surfaces **28** of the joint member **20**, or both, as desired.

Thereafter, a pair of joint members **29** are operatively interconnected to the joint member **20** in the manner illustrated in FIGURE 6 whereby the projections **32** of the legs **30** of the joint members **29** are respectively hooked around the projections **26** of the flanges **24** of the joint member **20**. When the joint members **29** are thus interconnected to the joint member **20**, the under surfaces **45** of the legs **31** of the joint members **29** are disposed closely adjacent the upper surfaces of the sheets **42**.

If desired, a suitable layer of adhesive **46** can be interposed between the mating surfaces of the joint members **29** and the sheets **42** by either applying the adhesive to the upper surfaces of the sheets **42** in the manner illustrated in FIGURE 5 or applying the adhesive to the under surfaces **45** of the joint members **29**, or both, as desired.

When the joint members **29** are interconnected to the joint member **20** in the manner illustrated in FIGURE 6, the legs **30** of the joint members **29** cooperate together to define a slot **47** between the joint members **29**.

Thereafter, the wedge-like member **37** of FIGURE 4 is driven downwardly into the slot **47** between the joint members **29** in the manner illustrated in FIGURE 7 by hammering on the end **39** of the wedge-like member **37** whereby the wedge-like member **37** cams the legs **30** of the joint members **29** outwardly, and, through the elasticity of the material of the joint members **29**, forces the legs **31** thereof downwardly against the sheets **42** to compact the sheets **42** between the joint members **29** and **20** whereby the sheets **42** are firmly held between the joint members **29** and **20** to complete the joint construction **10**.

As the wedge-like member **37** is driven into the slot **47** between the joint members **29**, the projections **35** on the legs **36** of the joint members **29** are subsequently received in the recesses **41** of the wedge-like member **37** to hold the wedge-like member **37** in its fully inserted position between the joint members **29**.

Because the legs **30** of the joint members **29** are initially disposed at greater angles to the legs **31** thereof before the wedge-like member **37** is driven therebetween, as illustrtaed in FIGURE 6, the wedge-like member **37** causes the legs **31** of the joint members **29** to be compactly compressed against the ends **43** of the sheets **42** when the

wedge-like member **37** is driven between the joint members **29** and cams the legs **30** outwardly whereby the sheets **42** are firmly held in place in the joint construction **10**.

Such compression action of the legs **31** of the joint members **29** is sufficient to hold the sheets **42** in place and further enhance the adhesive qualities of the layers of adhesive **44** and **46**, if utilized, the adhesive layers **44** and **46** not only further securing the sheets **42** in the joint construction **10** by providing a double shear action, but also rendering the joint construction **10** substantially moisture-proof.

Therefore, it can be seen that the novel joint construction **10** is not only adapted to interconnect together adjacent elements **42** in a unique and simple manner, but the joint construction **10** is also adapted to form the keel structure of a boat or the like.

While the joint member **20** has been illustrated and described as forming a keel structure of a boat or the like, it is to be understood that the keel portion **22** thereof can be eliminated, if desired, whereby the joint structure **10** can be utilized for other purposes, as is evident.

For example, the joint construction **10** can be modified in the manner illustrated in FIGURE 8 to interconnect together the sheets **42** at right angles relative to each other or at any other desired angle.

The modified joint construction **11** illustrated in FIGURE 8 comprises a first joint member **48** having a pair of angularly disposed legs **49** respectively provided with sheet-receiving channels **50** respectively defined by outwardly projecting flanges **51** of the joint member **48**.

A pair of like joint members **52** are adapted to be respectively operatively interconnected to the joint member **48** by having the hooked-shaped ends **53** of the legs **54** thereof hooked around the flanges **51** of the joint member **48**, whereby the other legs **55** of the joint members **52** are adapted to cooperate with the legs **49** of the joint member **48** to compress the adjacent ends **43** of the sheets **42** therebetween in the same manner as the joint construction **10** previously described.

In particular, a wedge-like member **56** is adapted to be driven into the slot defined between the legs **54** of the joint members **52** to cam the legs **54** outwardly and thereby cause the legs **55** to compress the sheets **42** against the legs **49** of the joint member **48** and thereby hold the sheets **42** in the joint construction **11**. The wedge-like member **56**, in a manner similar to the wedge-like member **37**, is provided with opposed recesses **57** which respectively receive hooked-shaped projections **58** on the legs **54** of the joint members **52** when the wedge-like member **56** is fully driven between the joint members **52** to hold the wedge-like member **56** in the joint construction **11**.

Initially, the legs **54** and **55** of each joint member **52** are disposed at a greater angle relative to each other than when the wedge **56** is driven between the adjacent joint members **52** in the manner illustrated in FIGURE 8 whereby the elasticity of the material of the joint members **52** causes the legs **55** thereof to compress against the ends **43** of the sheets **42** to hold the sheets **42** in the joint construction **11**.

Also, suitable layers of adhesive **59** can be disposed between the mating surfaces of the sheets **42** and the joint members **48** and **52** to further hold the sheets **42** in the joint construction **11** and provide a moisture-proof joint construction.

Therefore, it can be seen that the joint construction **11** of this invention is adapted to interconnect together adjacent plate-like or sheet-like elements in any angular relation relative to each other in a simple and effective manner.

If desired, the sheets **42** can be interconnected together in the manner illustrated in FIGURE 9 by the joint construction **12** of this invention.

The joint construction **12** of this invention is similar to the joint construction **11** previously described, except for the following features.

The first joint member **60** of the joint construction **12** has a pair of angularly disposed legs **61** respectively provided with outwardly directed flanges **62** and **63** defining sheet-receiving channels **64** in the manner previously described. The flange **62** has a beveled surface **65** which cooperates with a hooked-shaped end **66** of a joint member **67** formed in a manner similar to the joint member **52** previously described.

The joint member **67** has a pair of legs **68** and **69** integrally interconnected together whereby the leg **69** thereof cooperates with an adjacent leg **61** of the joint member **60** to compress the end **43** of its respective sheet **42** therebetween in the manner previously described.

A third joint member **70** comprises a single leg having a hooked-shaped end **71** operatively interconnected to the flange **63** of the joint member **60** and respectively cooperating with the adjacent leg **61** to compress the end **43** of the sheet **42** therebetween when a wedge-shaped member **72** is driven into the slot defined between the joint members **67** and **70**, as illustrated in FIGURE 9.

In order to hold the wedge-like member **72** in the joint construction **12**, the leg **68** of the joint member **67** has a hooked-shaped projection **73** on the outer end thereof which is adapted to be received in a recess **74** formed in the wedge-like member **72**, when the wedge-like member **72** is fully received between the joint members **67** and **70**, as illustrated in FIGURE 9.

When the wedge-like member **72** is driven between the joint members **67** and **70**, the wedge-like member **72** forces the leg **68** of the joint member **67** outwardly, whereby the elasticity of the material of the joint member **67** causes the leg **69** thereof to be compressed toward the leg **61** of the joint member **60** and thereby compress the end **43** of the sheet **42** therebetween. Similarly, the wedge-like member **72** forces the joint member **70** toward the leg **61** of the joint member **60** to compress the end **43** of the other sheet **42** therebetween.

If desired, suitable adhesive **75** can be applied to the mating surfaces of the sheets **42** and the joint members **60**, **67** and **70** to further hold the sheets **42** in the joint construction **12** and to provide a moisture-proof joint construction.

Accordingly, it can be seen that each of the joint constructions of this invention is formed in a relatively simple manner from a small number of basic parts assembled together in such a manner that the resulting joint construction is relatively strong and firmly holds the adjacent ends of adjacent elements in fixed positions at any desired angle relative to each other.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. A joint construction comprising a first member having a pair of sheet-receiving channels provided therein to define flat surfaces throughout the widths of said channels and a pair of spaced flanges disposed between said channels, a pair of sheets respectively disposed in said channels and respectively having one side thereof disposed in engagement with said flat surfaces of said first member and having the ends thereof disposed in engagement with said flanges, a pair of second members defining a slot therebetween and respectively having flat surfaces engaging the other sides of said sheets to prevent pivotal movement of said sheets relative to said members, said second members respectively being operatively interconnected to said flanges of said first member, adhesive means disposed between said sheets and said members, and a wedge-like member disposed in said slot and causing said second members to compress said sheets against said first member whereby said adhesive means is placed in double shear.

2. A joint construction as set forth in claim **1** wherein said wedge-like member is interlocked with said second members.

3. A joint construction as set forth in claim **1** wherein said second members each have a hooked-shaped portion hooked around its respective flange on said first member.

4. A joint construction as set forth in claim **1** wherein said first member is a keel of a boat or the like.

5. A joint construction as set forth in claim **1** wherein said joint construction forms a corner of a hull of a boat or the like.

6. A joint construction comprising a first member having a pair of sheet-receiving channels provided therein to define flat surfaces throughout the widths of said channels, a pair of sheets respectively disposed in said channels and respectively having one side thereof in engagement with said flat surfaces of said first member and having one end thereof disposed against said first member, a pair of second members defining a slot therebetween and respectively having flat surfaces engaging the other sides of said sheets to prevent pivotal movement of said sheets relative to said members, said second members being operatively interconnected to said first member, adhesive means disposed between said sheets and said members, and a wedge-like member dispoesd in said slot and causing said second members to compress said sheets against said first member whereby said adhesive means is placed in double shear.

7. A joint construction comprising a first member having a pair of sheet-receiving channels provided therein to define flat surfaces throughout the widths of said channels, a pair of sheets respectively disposed in said channels and respectively having one side thereof disposed in engagement with said flat surfaces of said first member and having one end thereof disposed against said first member, compression means operatively interconnected to said first member and having flat surfaces engaging the other sides of said sheets to prevent pivotal movement of said sheets relative to said member, said compression means having a slot provided therein, adhesive means disposed between said sheets and said compression means and first member, and wedge-like means disposed in said slot and causing said compression means to compress said sheets against said first member whereby said adhesive means is placed in double shear.

8. A joint construction comprising a first member having a pair of channels provided therein to define surfaces throughout the widths of said channels, a pair of elements respectively disposed in said channels and engaging the entire surfaces of said first member and having one end thereof disposed against said first member, compression means operatively interconnected to said first member and engaging said elements to prevent pivotal movement of said elements relative to said member, said compression means having a slot provided therein, adhesive means disposed between said elements and said compression means and first member, and a wedge-like member disposed in said slot and causing said compression means to compress said elements against said first member whereby said adhesive means is placed in double shear.

9. A joint construction comprising a first member having a pair of sheet-receiving channels provided therein to define flat surfaces throughout the widths of said channels and a pair of spaced flanges disposed between said channels, a pair of sheets respectively disposed in said channels and respectively having one side thereof disposed in engagement with said surfaces of said first member and having ends disposed against said flanges, a pair of second members each having a pair of legs, one leg of each second member being disposed in engagement with the other side of one of said sheets to prevent pivotal movement of said one sheet relative to said members and the other leg thereof cooperating with the other leg on the other second member to define a slot between said second members, said second members being operatively interconnected to said first member, adhesive means

disposed between said sheets and said members, and a wedge-like member disposed in said slot and causing said one legs of said second members to compress said sheets against said first member whereby said adhesive mean is placed in double shear.

10. A joint construction comprising a first member having a pair of sheet-receiving channels provided therein to define flat surfaces throughout the widths of said channels and a pair of outwardly directed and spaced flanges disposed between said channels, a pair of sheets respectively disposed in said channels and respectively having one side thereof engaging said surfaces of said first member and having ends disposed against said flanges, a pair of second members each having a pair of legs, one leg of each second member having a hooked-shaped end engaging one of said flanges and preventing movement of said second member in a particular direction relative to said first member, said one leg of each second member being disposed spaced from said one leg of the other second member to define a slot between said second members and having an outwardly extending projection facing the projection on the other second member, the other leg of each second member being disposed in engagement with the other sides of said sheets to prevent pivotal movement of said sheets relative to said members,

adhesive means disposed between said sheets and said members, and a wedge-like member disposed in said slot and causing said other legs of said second members to compress said sheets against said first member whereby said adhesive means is placed in double shear, said wedge-like member having opposed recess means provided therein and respectively receiving said projections of said second members to lock said wedge-like member in said slot.

References Cited by the Examiner

UNITED STATES PATENTS

569,235	10/1896	Rockwell	20—92
1,697,153	1/1929	Waddington	189—35
1,793,503	2/1931	Michaels	52—475
2,213,402	9/1940	Lowry	52—282
2,839,790	6/1958	Collings	52—589
2,898,647	8/1959	Bush et al.	52—399

FOREIGN PATENTS

578,349	6/1946	Great Britain.

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