

Nov. 30, 1948.

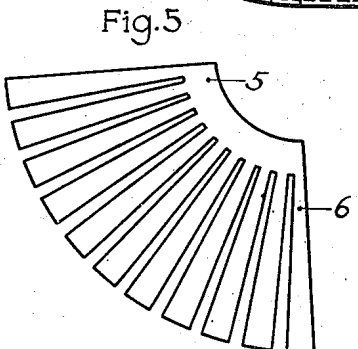
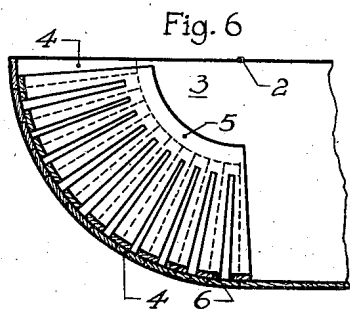
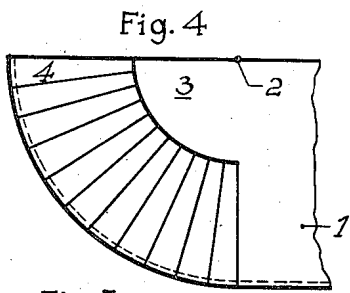
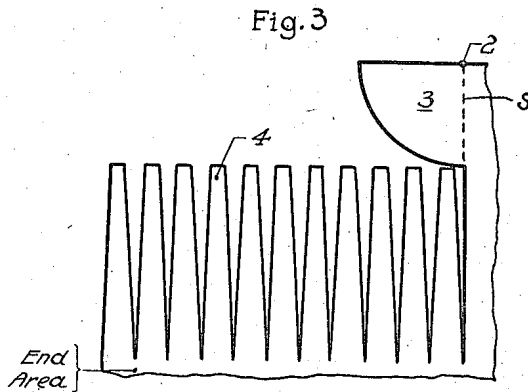
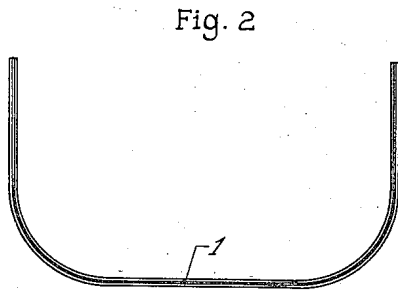
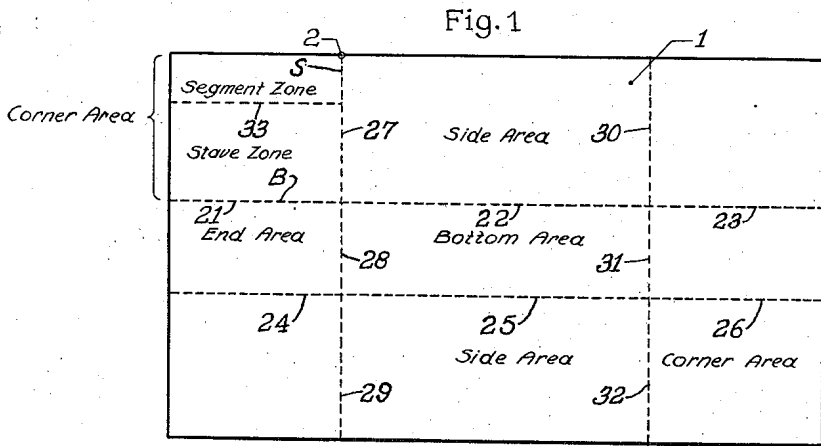
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LIGHTER SHELL AND METHOD OF MAKING SAME

Filed Feb. 14, 1944

3 Sheets-Sheet 1



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LIGHTER SHELL AND METHOD OF MAKING SAME

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3 Sheets-Sheet 2

Fig. 7

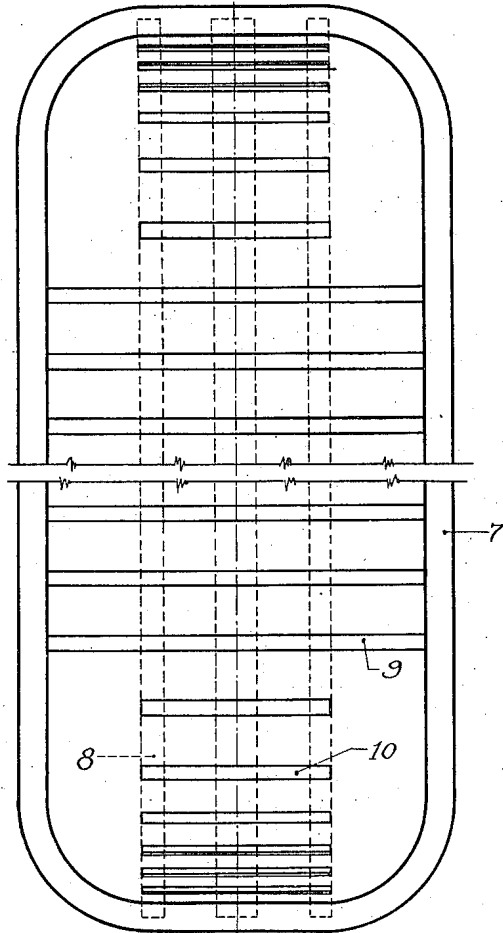
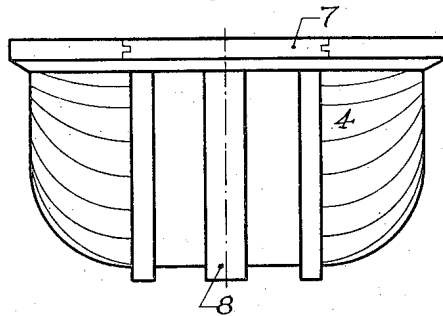


Fig. 8



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Fig. 9

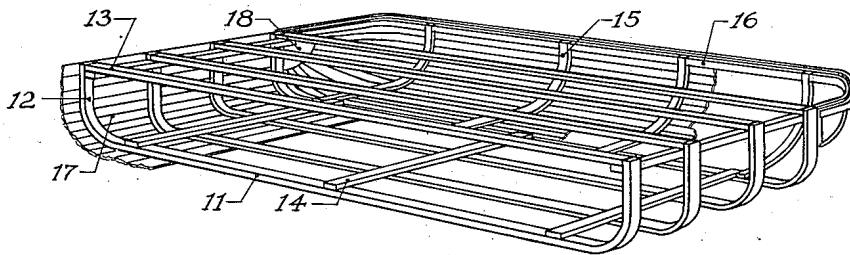


Fig. 10

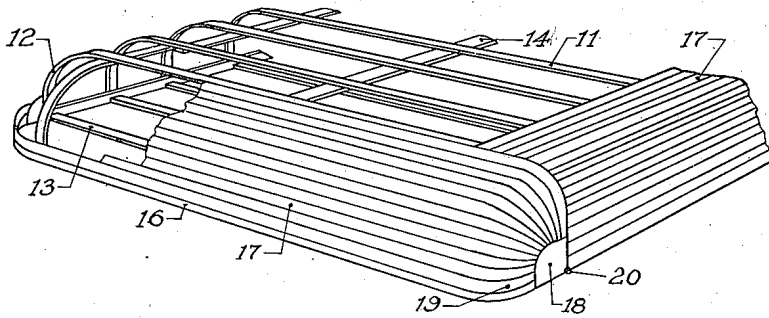


Fig. 11

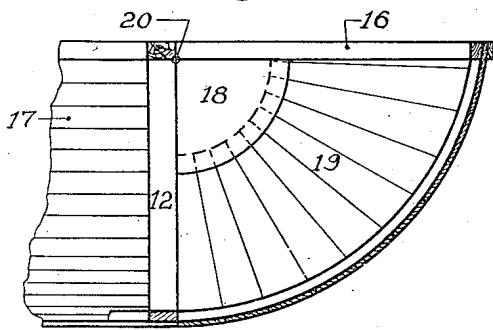
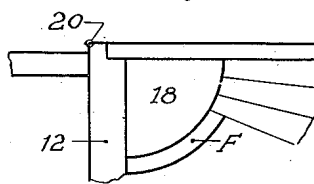


Fig. 12



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# UNITED STATES PATENT OFFICE

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## LIGHTER SHELL AND METHOD OF MAKING SAME

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Application February 14, 1944, Serial No. 522,337

9 Claims. (Cl. 114—26)

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This invention relates to lighter shells, that is to say, shells for freight hauling boat-like structures.

The principal object of the invention is to provide a lighter shell which is relatively inexpensive to manufacture and light in weight and which has a high storage capacity with good water flow characteristics.

Another object is to provide a lighter having a shell provided with rounded corners of novel construction which may be easily and inexpensively fabricated.

A further object is to provide a rounded corner shell which can be manufactured either out of a unitary sheet of wood or metal or largely from straight stock lumber in combination with a relatively small number of preformed, curved members.

Figures 1-8 illustrate one embodiment of the invention in which the shell is made from a unitary sheet of wood, while Figures 9-11 illustrate another embodiment in which the shell is composed of straight stock lumber in combination with some preformed curved members. An explanation of these figures follows:

Figure 1 is a plan view of the sheet stock used in making the shell;

Figure 2 is an enlarged end view of the sheet when first bent to the cross-sectional shape of the center of the shell;

Figure 3 is a side elevation of one corner of the bent sheet illustrating how each corner of the sheet is cut during the process of manufacture, this bent corner being flattened out for the sake of clearness;

Figure 4 is a fragmentary view similar to Figure 3 illustrating how each corner of the sheet appears when the corner members are brought into assembled relationship;

Figure 5 is a plan view of an auxiliary corner reinforcing member;

Figure 6 is a side elevation corresponding to Figure 4 but with the auxiliary member of Figure 5 in final position;

Figures 7-8 are plan and end views respectively of the shell and frame assembly;

Figure 9 is a top perspective view of a barge embodying the invention, one end of the barge and portions of the shell being omitted for the sake of clearness;

Figure 10 is a bottom perspective view of the incomplete barge of Figure 9;

Figure 11 is a section along line 11-11 of Figure 10; and

Figure 12 is a detail of the corner assembly.

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It has recently been proposed to provide small boats, (having overall dimensions of 9' L×3.5' W×2' D, for example), with retractable side wheels for use as amphibious lighters or, in other words, as freight hauling boats on water and carts on land. For crafts of this size, a rounded corner shell may be readily made out of a unitary sheet of plywood in accordance with the present invention.

In making the shell, a unitary sheet 1 of say 3/4" plywood, preferably rectangular in shape and of appropriate length and width is made from three or four plies of veneer stock. As shown in Figure 1, this plywood sheet is subdivided by dotted lines 21 to 32 into bottom, side, end and corner areas, which are available to form the bottom, sides, ends, and corners of the shell. Each corner area is further shown as having a stave zone and preferably a segment zone separated by dotted line 33. The stave zone occupies a rectangular space which extends from its base B, along the entire margin (21 or 27) of one of the flanking (side or end) areas, toward, but preferably not entirely to, the opposite edge of the corner area so as to leave a segment zone, occupying the remainder of the corner area with its base S along the remaining margin of the other flanking area. In other words, the stave zone base B is coincident with the entire adjacent margin 21 of one end area, for example, while the segment zone base S, when provided, is coincident with a portion of the adjacent margin 27 of the adjacent side area. The intersection of this latter margin 27 with that outer edge of the corner area, adjacent to it and directly opposite the stave zone base B, provides a center point area which is designated by the numeral 2. While the base B of the stave zone may be along the side area margin 21, it preferably is placed along the end area, as indicated. However, in either case, the sheet, in accordance with the present invention, is processed to form either an entire shell, or a shell section involving one or two corners, by bending, blanking, assembling, and securing operations.

These operations comprise: bending the sheet upwardly along one section embracing the corner area and one flanking area so that such flanking area curves upwardly to form one of the main walls and the corner area curves upwardly from the other flanking area; blanking the corner area (either before or after the bending operation) to form a series of staves, extending across the stave zone from its base to the segment zone and tapering in the same direction, and a sector member

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occupying the corner angle formed at the center point by the segment zone base and the adjacent outer edge of the corner area, the arc of the sector member extending through the segment zone; assembling the staves and sector member by bending the sheet, along another section embracing the corner area and the other flanking area, in a manner to cause the other flanking area to curve upwardly and form the other main wall and the staves to curve from their base convergingly toward the center point area so as to position the ends of the staves along the arc of the sector member; and securing the staves and sector member in assembled relationship. Figures 1-6 illustrate one mode of practicing the invention wherein the bending operation is performed before the blanking operation on opposite side sections, each embracing one side area and two corner areas with the base of the stave zone of each corner area extending along the adjacent end area.

The bending operation may be advantageously performed on a sheet 1 when its plies are freshly glued because when the sheet is oven or otherwise cured in its bent shape long enough to set the glue, it will hold such shape more or less permanently. Accordingly, the sheet is bent in a first bending operation before the glue sets along both side sections so that one side section curves upwardly from lines 21, 22 and 23 while the other curves upwardly from lines 24, 25 and 26. In this way, each side area curves upwardly from the bottom area to form opposite side walls and each corner area curves upwardly from the adjacent end area. With both side sections curved at one time the sheet will assume the shape shown in Fig. 2. After the sheet has been cured in this bent shape long enough to set the glue, it is ready for the blanking operation.

In performing the blanking operation, a template (not shown) is secured in position at each corner of the sheet and such corner cut to the outline of the template in order to form a sector 3 in the segment zone and a series of staves 4 in the stave zone. Each sector 3 occupies the corner angle formed in the segment zone adjacent the center point area 2 by the base S of that zone and the adjacent outer edge of the corner area. The arc of the sector 3 preferably curves circularly through the segment zone about the center point area 2, the radius of the arc being equal to the length of the base. It is not essential, however, that the arc of the sector form a portion of a circle since its contour may include straight portions or offset portions. Each set of staves 4 projects from the base B of its particular stave zone across that zone to the segment zone and, since the stave zone is upwardly curved, the individual staves are likewise upwardly curved. Additionally each stave tapers from its base in the direction of its length so that a reversely tapered space is formed between adjacent staves.

In performing the assembling operation, the end sections are bent to curve upwardly from lines 27, 28 and 29 at one end and lines 30, 31 and 32 at the other. Each end section is thus bent to form an end wall which curves circularly about the axis of sector 3 on a radius equal to the depth of the boat. At the same time, each base B of the staves 4 is necessarily bent along its length so as to curve upwardly in the same manner causing the staves to swing sidewise relatively to each other closing the space between staves and bringing the ends of the staves into assem-

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bled position along the arc of the sector 3. It will now be appreciated that the taper of the staves is such as to permit relative sidewise movement to the extent necessary to bring the side edges of adjacent staves into contact with each other when the end section is bent upwardly to its final position. It will also be appreciated that without the sector 3, the staves 4 would necessarily be tapered to points converging upon the center point 2. While this, of course, is possible, a better construction appears to result when a sector 3 of appreciable radius is provided and the length of the staves reduced proportionately. Where the arc of sector 3 includes flat or straight portions, either the contour of the end wall or the contour collectively formed by the ends of the staves, may be correspondingly modified. If the arc of the sector 3 contains outwardly or inwardly offset portions, the length of the corresponding staves may be appropriately shortened or lengthened.

In securing the assembly, the side edges of the staves may be glued to each other and the end edges thereof glued to the arc of sector 3. In order, however, to reinforce the rounded corners of the shell and render them thoroughly watertight, an auxiliary plywood corner member is preferably provided. This auxiliary corner member includes an arcuate section or auxiliary sector 5 and a series of auxiliary staves 6 integrally formed with the auxiliary sector 5. The auxiliary sector 5 is dimensioned to overlap and cover the circumferential joint line of the sector 3. The auxiliary staves 6 are staggered in relation to the main or curved staves 4 and dimensioned to cover their joint lines. These auxiliary staves need not be tapered and preferably are not curved since they may readily be bent to the curvature of the curved staves 4. This auxiliary corner member is placed within the shell corner and glued in position to cover all joint lines. In any of the gluing operations herein involved, any suitable type of glue may be employed. In work of this general character, synthetic resinous glues of the low temperature phenolic type are commonly employed.

It will be understood that the blanking operation may readily be performed either before or after the bending operation and that the bending operation may be performed along an end section of the sheet with the base of the stave zone along the side section. The bending operation may also be performed along either the side or the end section with the base of the stave zone crossing the same section, in which event the staves will be curved in the direction of their length during the assembling operation.

The shell, thus formed, is sufficiently sturdy and rigid to permit its application to many uses without any reinforcing framework. Where a framework is desired, it may be conventionally constructed in accordance with routine engineering practices and arranged to fit over or within the shell. In the conventional arrangement shown, the framework comprises an upper rail 7 having straight side and end portions connected by curved corner portions and a suitable number of beams 8 (three being shown) having straight central portions extending lengthwise of the boat at the bottom thereof and curved end portions extending outwardly and upwardly at the front and rear of the boat, the upper ends of the beams 8 being rigidly secured to the straight end portions of the rail 7 in any approved manner. The beams are preferably made of lami-

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nated lumber which is glued, bent to shape and curved in their bent shape until the glue sets. Portions of the rails may be made in like manner and suitably joined.

It will be appreciated that the entire shell may now be snugly fitted within the interior of the frame and glued or otherwise fastened to either or both the beams 8 and the rail 7. If desired a series of U-shaped rib members 9 may be transversely arranged in and snugly fitted to the shell at intervals along its length while straight members 10 may be similarly arranged along the straight portions of both ends of the shell. These members, which carry and distribute the weight, are preferably glued to the shell but may be otherwise suitably secured thereto.

A wooden lighter constructed as above described has many advantages. It is relatively inexpensive to manufacture and light in weight. The entire interior of the shell is unobstructed and therefore readily accessible and fully available for freight purposes. Its rounded sides, ends and corners minimize its resistance to water. The bottom beams 8 serve to protect the shell and at the same time provide runners upon which the lighter rides when pulled from the water. Necessarily, when provided with side wheels, it is admirably suited for use on land as a freight hauling cart.

Where the thickness of plywood is considered insufficient for the shell, the construction shown in Figures 9-12 may be employed. In this arrangement, the framework includes a central assembly and opposite identical end assemblies.

The central assembly comprises: a suitable number of transverse beams 11 spaced at intervals along the length of the barge, each beam 11 being of U-shape so as to have a straight central portion or bight extending transversely across the bottom of the barge and opposed end portions curving upwardly to form side ribs 12; a cross member 13 for each beam 11, each cross member extending between the upper ends of opposed side ribs 12 and being secured to both; and a series of longitudinal tie members 14 spaced at intervals across the width of the barge, each longitudinal tie member preferably crossing and being secured to all of the transverse beams 11.

Each end assembly includes: a series of upwardly curved end ribs 15 spaced at intervals across the width of the flat bottomed portion of the barge with their lower ends extending over and being secured to at least two of the transverse beams 11, the end ribs 15 curving upwardly in the manner of the side ribs 12; and a horizontal end rail 16 of U-shape having a straight front portion or bight extending over and connected to the upper ends of the end ribs 15 and curved corner portions connected to the upper ends of the adjacent side ribs 12.

In other words, the central and end assemblies of the barge present: a bottom which is horizontally straight in its entirety; side and end portions, each of which is horizontally straight but upwardly curved; and corner portions, each of which is both horizontally and upwardly curved. The horizontal straight portions of the frame may be readily covered by horizontally straight stock lumber 17. Each horizontally and vertically curved corner is covered in accordance with the present invention.

Each curved corner is defined by a side rib 12, an end rib 15, and a curved corner portion of the horizontal end rail 16. Each corner presents a

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triangular opening having two upper corners, one adjacent the side rib and the other adjacent the end rib. The rounded corner portion of the shell is fabricated by securing a quarter circle wood sector 18 in one of the upper corners adjacent one of the ribs and extending curved tapered staves 19 from the opposite rib across the opening to the arc of sector 18. In the barge illustrated, the sector 18 is secured to the side rib 12 and the rail 16 so that the center point of sector 18 may be said to coincide with the center point area 20 formed by the intersection of rib 12 and rail 16. The curved tapered staves 19 are made by extending the straight members used to cover the adjacent end portion of the barge sufficiently beyond the limits of such portion to permit the ends of such members to be appropriately tapered and curved to converge toward the center point 20. The ends of the staves may be secured in any suitable way to a flange F on the sector member 18.

It will be understood that the tapered staves 19 can be made identical in curvature and taper and that in practice they could be identically preformed with the desired curvature and taper so that final assembly consists merely in fitting and securing them in place. With this arrangement, the lowermost stave curves upwardly, the uppermost stave curves horizontally and the intermediate staves progressively ranging from lowermost to uppermost progressively change from upward toward horizontal curvature.

It will be appreciated that the top of the barge may be finished in any desired way and that the barge will be caulked in accordance with normal procedure. A barge of this type has many advantages. In the first place it requires only three types of curved members, namely, the U-shaped beams 11 and rail 16, which are identical, the side ribs 12 and the curved staves 19. Each of these curved members may be readily made at the factory and either assembled there or shipped elsewhere for assembly into the final barge. As a consequence the barge is relatively inexpensive to make and light in weight. By employing a standard width, its length may be varied during manufacture at the will of those assembling the barge. Likewise it has many of the other advantages pointed out in connection with the structure shown in Figures 1-9. Furthermore, a thin plywood shell of the type shown in Figures 7 and 8 might readily be fitted to it if desired.

It will be understood that the center point area may be viewed as a point or circle where the base of the stave zone is circularly curved in the final assembly. In such case, the stave zone base curvature forms part of a circle extending concentrically about the axis of the center point area. But, as noted previously, the base of the stave zone is not necessarily circularly curved. Consequently, where it varies from circular curvature, the limits of the center point area will likewise vary.

Having described my invention, I claim:

1. In a process of fabricating a shell section, having upwardly curved main (side and end) walls connected by an upwardly and horizontally curved corner wall, comprising: providing a flat sheet having a bottom area and a corner area flanked by side and end areas, said areas being so disposed that the corner area and its flanking end area are separated from the side and bottom areas, respectively, by one line while the corner area and its flanking side area are separated from the end and bottom areas, respectively, by a second line which intersects the first line substan-

tially at a right angle, the corner area containing an inner stave zone and an outer segment zone, the stave zone having a base coinciding with one of said intersecting lines and which extends from said base toward the opposite edge of the corner area, the segment zone occupying the remainder of the corner area with its base coinciding with the other intersecting line; bending the sheet along one of said intersecting lines so that the one flanking area curves upwardly to form one of the main walls and the corner area curves upwardly from the other flanking area; blanking the corner area to form a series of staves, extending across the stave zone from its base to the segment zone and tapering in the same direction, and a sector occupying the corner angle formed by the segment zone base and the adjacent outer edge of the corner area, the arc of the sector extending through the segment zone; assembling the staves and sector to form the corner wall by bending the sheet along the other intersecting line in a manner to cause the other flanking area to curve upwardly from the bottom area and form the other main wall and the staves to curve from their base convergently toward the sector with their ends positioned along the arc of the sector; and securing the staves and sector in assembled relationship.

2. The process of claim 1 wherein: the bending, blanking and assembling operations are performed in the order named.

3. The process of claim 1 wherein: the sheet is composed of plywood, the plies of which are glued, assembled to form the sheet, the first bending operation performed before the glue sets and the sheet thereupon cured to set the glue and hold the sheet in its bent shape.

4. The process of claim 1 wherein the securing step includes: positioning an auxiliary member having a sector and staves over the joint lines formed by the sector and staves and bonding the auxiliary member to the sector and staves.

5. A lighter shell section comprising: outwardly extending and upwardly curving side and end walls, the adjacent upwardly curved margins of which flank an interposed corner area; and an upwardly and horizontally curved corner wall in the corner area connecting the side and end walls by which said area is flanked, said corner wall being composed of a series of staves which curve and taper from their base along the margin of one flanking wall convergently toward a center point area adjacent the upper end of the curved margin of the other flanking wall.

6. A lighter shell section comprising: outwardly extending and upwardly curving side and end walls, the adjacent upwardly curved margins of which flank an interposed corner area; and an upwardly and horizontally curved corner wall in the corner area connecting the side and end walls by which the corner area is flanked, said corner wall being composed of a sector having a base extending along the upper end of the margin of one wall and a series of staves having a base extending along the margin of the other wall, the sector having an arc which curves upwardly through the corner area about a center point area at the upper end of its base and the staves curving and tapering from their base convergently toward the sector with their ends positioned along the arc of the sector.

7. The shell section of claim 6 including: an auxiliary corner member having a sector and staves positioned over the joint lines formed by

the sector and staves of the corner wall; and means bonding the auxiliary member to the corner wall to reinforce the wall and seal the joint lines.

8. In a process of fabricating a lighter shell section, having upwardly curved side and end walls connected by an upwardly and horizontally curved corner wall comprising: providing a flat sheet of wood having a bottom area and a corner area flanked by side and end areas, said areas being so disposed that the side area is separated from the bottom area by a first substantially straight demarcation line, the end area is separated from the bottom area by a second substantially straight demarcation line which intersects said first demarcation line substantially at a right angle, the corner area is separated from the end area by a first substantially straight base line which extends transversely to said second demarcation line substantially as a continuation of said first demarcation line, and the corner area is separated from the side area by a second substantially straight base line which extends transversely to said first demarcation line substantially as a continuation of said second demarcation line; blanking the corner area to form a series of staves extending and tapering outwardly from one of said base lines substantially at a right angle thereto; forming the side, end and corner walls by bending the sheet in a manner such that the side area curves upwardly from said first demarcation line, the end area curves upwardly from said second demarcation line and the corner area staves curve in closely assembled relationship from said one base line convergently toward said other base line in a manner such that successive staves have progressively less upward curvature and more horizontal curvature than the preceding staves beginning with the innermost stave which curves from the inner portion of said one base line upwardly along and adjacent to said other base line and ending with the outermost stave which curves from the outer portion of said one base line horizontally toward said other base line; and securing the staves in assembled relationship.

9. In a process of fabricating a lighter shell section, having upwardly curved side and end walls connected by an upwardly and horizontally curved corner wall comprising: providing a flat sheet of wood having a bottom area and a corner area flanked by side and end areas, said areas being so disposed that the corner and side areas are separated from the end and bottom areas by a first substantially straight line, while the corner and end areas are separated from the side and bottom areas by a second substantially straight line which intersects the first line substantially at a right angle; blanking the corner area to form a series of staves extending and tapering outwardly from one of said intersecting lines in a direction generally parallel to the other intersecting line; forming the side, end and corner walls by bending the sheet in a manner such that the side area curves upwardly from said first intersecting line, the end area curves upwardly from said second intersecting line and the corner area staves curve in closely assembled relationship from one of said intersecting lines convergently toward the other intersecting line in a manner such that successive staves have progressively less upward curvature and more horizontal curvature than the preceding staves beginning with the innermost stave which curves from the

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inner portion of said one intersecting line upwardly along and adjacent to said other intersecting line and ending with the outermost stave which curves from the outer portion of said one intersecting line horizontally toward said other intersecting line; and securing the staves in assembled relationship.

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REFERENCES CITED

The following references are of record in the file of this patent:

| 10 | Number    |
|----|-----------|
|    | 683,908   |
|    | 1,415,368 |
| 5  | 1,644,203 |
|    | 2,181,912 |
|    | 2,232,313 |

10

UNITED STATES PATENTS

| Number | Name          | Date          |
|--------|---------------|---------------|
|        | Buyten -----  | Oct. 8, 1901  |
|        | Lange -----   | May 9, 1922   |
|        | Pointer ----- | Oct. 4, 1927  |
|        | Ries -----    | Dec. 5, 1939  |
|        | Burch -----   | Feb. 18, 1941 |

FOREIGN PATENTS

| Country             | Date          |
|---------------------|---------------|
| Germany -----       | Feb. 26, 1901 |
| Great Britain ----- | May 13, 1938  |