

[54] **ANCHOR CROWN CONSTRUCTION**  
 [75] Inventor: **Daniel Comstock Hungerford**, North Palm Beach, Fla.  
 [73] Assignee: **Brunswick Corporation**, Skokie, Ill.  
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*Primary Examiner*—Trygve M. Blix  
*Assistant Examiner*—Galen L. Barefoot  
*Attorney, Agent, or Firm*—Malin & Haley

[52] **U.S. Cl.**..... **114/208 R**  
 [51] **Int. Cl.**..... **B63b 21/44**  
 [58] **Field of Search**..... 114/206 R, 207, 208 R;  
 287/189.36 D; 29/513

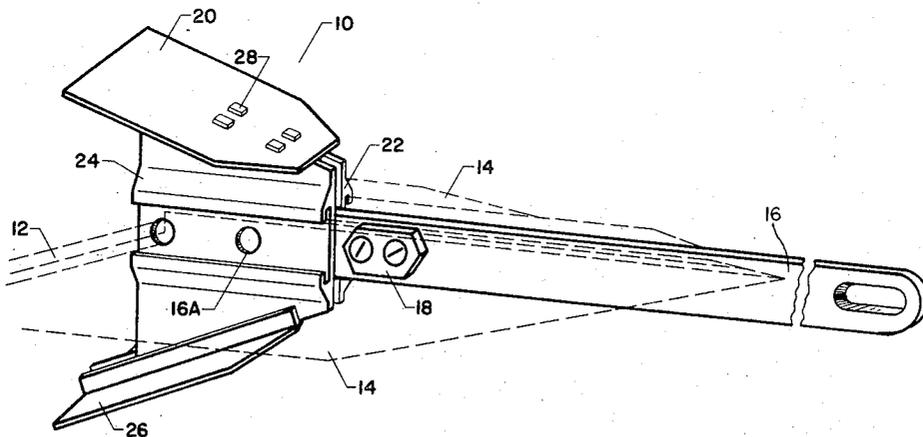
[57] **ABSTRACT**

A twin-fluke anchor having an improved crown construction which eliminates welding seams while improving strength and corrosion resistance. The improved crown is comprised of four plates arranged in a box-like structure, the plates being rigidly coupled together by providing malleable projections along the edge faces of the parallel side plates, each projection being received through a separate aperture in the top or bottom plate and being greater in length than the thickness of the top or bottom plates. Each protruding portion is then hammered, causing the malleable material to spread over the top of the aperture whereby the plate is then retained rigidly to the side plates.

[56] **References Cited**  
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**4 Claims, 7 Drawing Figures**



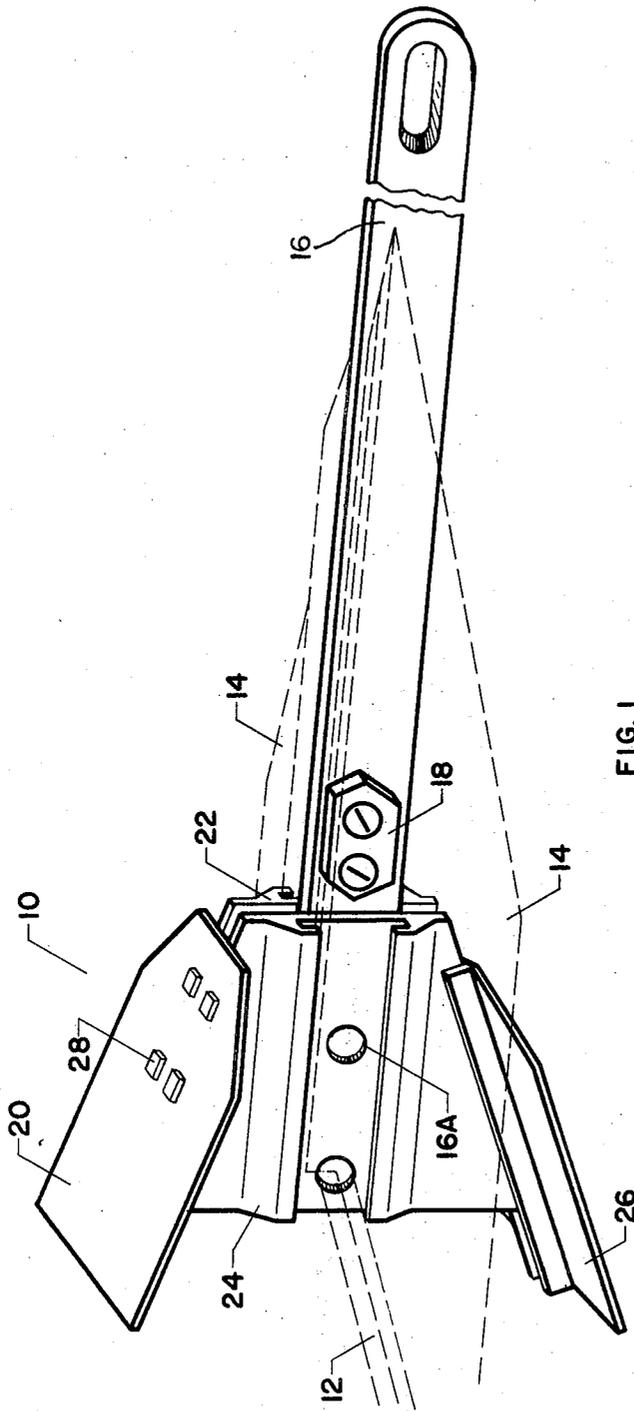


FIG. 1

FIG. 2

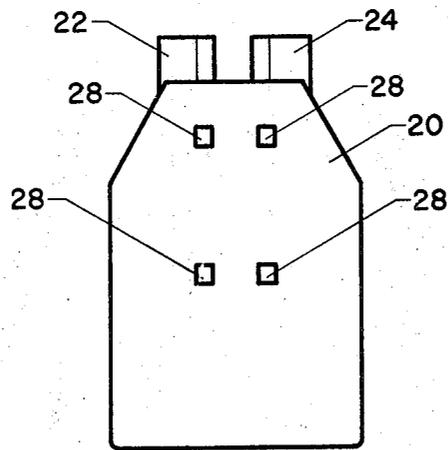
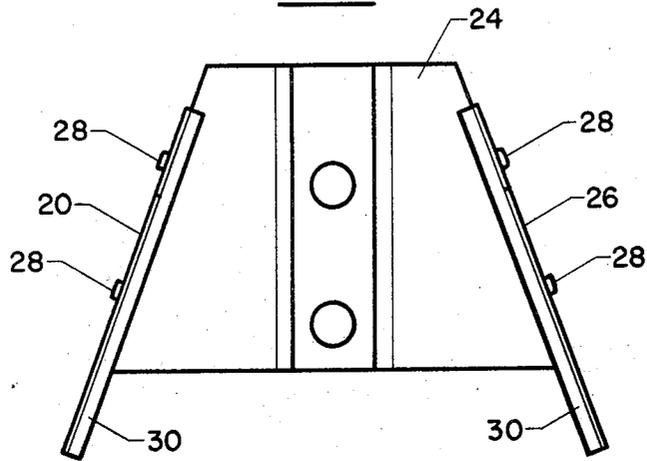


FIG. 3

FIG. 4

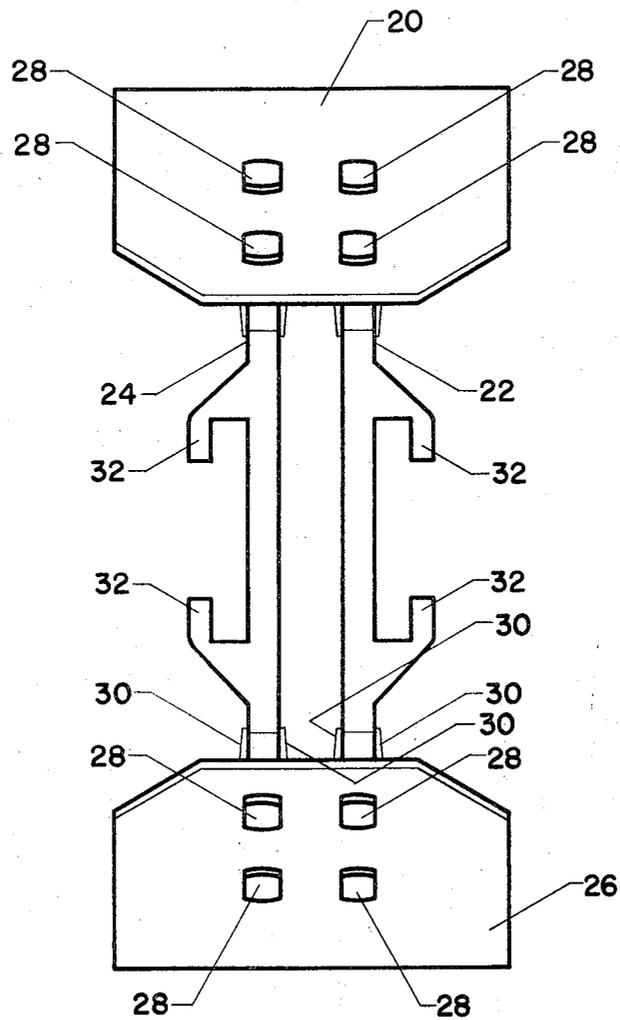


FIG. 6A

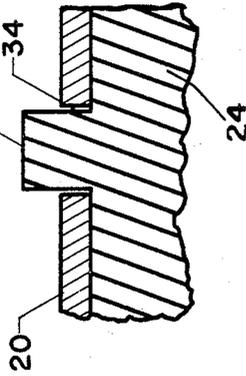


FIG. 6B

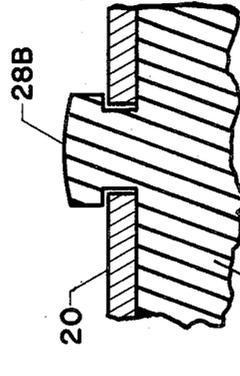
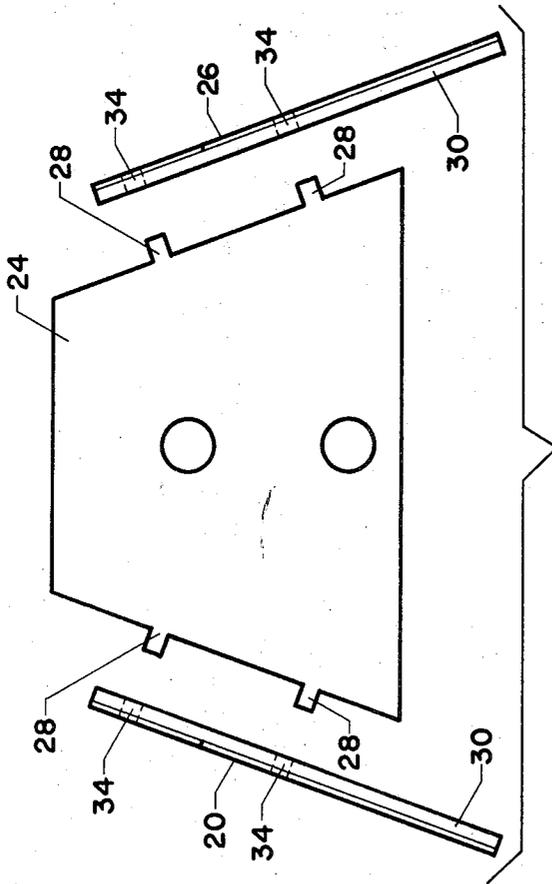


FIG. 5



## ANCHOR CROWN CONSTRUCTION

### BACKGROUND OF THE INVENTION

This invention relates generally to an improved anchor crown utilized in a twin-fluke anchor, and more specifically, to improved construction techniques utilized in the attachment of upper and lower crown plates to parallel adjacent side-crown plates, whereby the necessity for welded seams is eliminated, while increasing crown strength and corrosion resistance.

In the past, in anchor crown construction, anchor crown plates have been coupled together utilizing welding techniques, which have proved to be expensive and have caused corrosion from electrolysis between the weld material and the adjoining metal surfaces. Various metals, such as aluminum, desirous in anchor construction because of light weight characteristics are expensive and difficult to weld properly to provide the strength necessary to keep the crown intact under all load conditions. Welding also increases construction time, costs, and requires a skilled artisan.

Applicant's improved crown eliminates welding completely in the construction of the crown while increasing the overall strength of the crown plate coupling. The crown plate construction shown by Applicant is especially useful when utilized in conjunction with Applicant's invention entitled "Twin-Fluke Anchor Having Improved Shank Crown Contact," copending U.S. Pat. Application, Ser. No. 178,232, filed Sept. 9, 1971, now U.S. Pat. No. 3,771,486, which allows the shank to contact the leading edge of the parallel side plate instead of the top and bottom crown plate, thereby eliminating shank forces which would tend to separate the top and bottom plates from the side plates. Applicant's present invention may be utilized in an anchor crown having increased strength requirements in coupling the upper, lower and crown side plates while still providing an anchor crown that is extremely corrosion resistant due to the absence of welding seams.

### BRIEF DESCRIPTION OF THE INVENTION

In a twin-fluke anchor having a crown, a stock, a pair of flukes coupled to said crown and said stock, a shank moveably coupled to said crown, the improvement comprising a crown having four plates arranged in a hollow, box-like structure, two of said plates being essentially parallel and aligned to form the sides of the crown, said side plates having a plurality of malleable protrusions along opposite edges, said remaining pair of plates comprising top and bottom crown plates, each plate having a plurality of apertures spaced to coincide and receive protruding portions of said side plate edges, said protrusions received through said apertures on said top and bottom plates and expanded and enlarged around each of said apertures whereby the upper and lower plates are rigidly retained. For optimum strength, the projection should be at least three times in length greater than the thickness of the upper or lower plate that is coupled to the side plate, so that when the projection is hammered and deformed, because of its malleability the material will be sufficiently enlarged to adequately cover the aperture and provide maximum strength to prevent the plate from being removed. Any conventional hammering means which provides a translational linear force upon the end surface of the projection sufficient to shape the malleable material to provide the necessary spreading of the ma-

terial over and about the aperture is suitable. A light weight metal such as aluminum, is utilized for the material in construction of the crown plates of the upper and lower plates and the parallel outside plates.

The method of construction of the crown is comprised of the steps of securing the side plates in parallel relationship to each other, placing the top and bottom plates adjacent and in contact with the top and bottom edges of the parallel plates while placing the top and bottom plate apertures over and receiving the projections along the edges of the side plates, and hammering down a portion of the projecting members that lies above the upper and lower surfaces, thereby enlarging the upper portion of the projecting members whereby they are greater than the upper and lower plate apertures, rigidly securing the side plates to the upper and lower crown plates.

It is an object of this invention to provide an improved twin fluke anchor of light-weight design.

It is another object of this invention to provide an anchor crown of increased strength and corrosion resistance.

And yet, another object of this invention, is to provide an improved anchor crown with increased strength requiring no welded seams.

And still yet, another object of this invention is to provide an improved anchor crown construction utilized in combination with an anchor shank having a maximum fixed angle in which the shank does not contact the upper and lower crown plates.

In accordance with these and other objects which will be apparent hereinafter, the instant invention will now be described with particular reference to the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a twin fluke anchor constructed in accordance with Applicant's invention.

FIG. 2 shows a side elevation of Applicant's improved anchor crown.

FIG. 3 shows a front elevation of Applicant's improved anchor crown.

FIG. 4 shows a plan view of the front crown constructed in accordance with Applicant's invention.

FIG. 5 shows an exploded side plan view of Applicant's anchor crown.

FIG. 6A shows a cut-a-way and cross section of the side and top plates and plate aperture before the metal is hammered into position.

FIG. 6B shows the crown coupling and a cut-a-way cross section after the projection coupling has been deformed to expand about the aperture.

### PREFERRED EMBODIMENT OF THE INVENTION

Referring now to the drawing, and in particular FIG. 1, a twin-fluke anchor is shown constructed in accordance with Applicant's invention and includes an anchor crown, generally at 10, flukes (in phantom) 14 coupled to the crown sidewalls 22 and 24 respectively and a shank 16 coupled to the pivot pin 16A which is housed within crown 10. A shank stop 18 contacts the forward leading face of the crown side plates 22 and 24 thus insuring that the shank will have a fixed maximum angle with the plane of the flukes, while preventing the shank from contacting either the upper or lower crown plate 20 or 26 respectively.

Anchor stock 12 is coupled through crown side walls 22 and 24 and is connected to the trailing edge of each fluke 14.

The anchor crown 10 is comprised of essentially four plates arranged in a trapezoidal prism shape having parallel side walls 22 and 24 coupled at the tapered side wall edge surfaces to top and bottom crown plates 20 and 26. The top and bottom crown plates 20 and 26 are rigidly fixed to the crown side walls by malleable side wall edge projections 28, which are received by apertures in each of the top and bottom plates and are then deformed and shaped to expand about the apertures in size thereby preventing the removal of the plates from the side walls.

FIG. 2 shows projections 28 expanded above top and bottom plates 20 and 26. The side plate 24 is received along its tapered edge by a plurality of parallel grooves or channels in the bottom part of each plate 20 and 26 for increased lateral rigidity.

FIG. 3 shows the parallel side walls 22 and 24 and side wall edge projections 28 which are part of the leading edge or tapered edge of each side wall being received through apertures in top plate 20, rigidly coupling and holding the side walls in parallel relationship.

FIG. 4 shows a front view of the anchor crown in which the top plate 20 and the bottom plate 26 is coupled to the parallel crown side wall plates 22 and 24 by the expanded projections 28. For further and increased rigidity, the engaging surface face of the side walls is received in a plurality of channels or grooves 30 to increase lateral stability. Side walls also have flange members 32 for coupling flukes to the anchor crown.

FIG. 5 shows an exploded view of the crown prior to the top plate 20 and bottom plate 26 coupling to side walls 24. The tapered edges of the side walls have a plurality of projections 28 which are received into apertures of substantially the same cross-sectional size and shape in the respective plate 20 and 26. The crown plate channels are shown at 30.

FIG. 6A shows a projection 28A having been received through an aperture 34 in crown plate 20. Prior to its being hammered, it is smaller in cross-section area than the aperture 34. FIG. 6B shows the projection 28B after it has been hammered and it expands about the perimeter of the aperture on the top side of plate 20 away from the contacting edges which thereby rigidly couples plate 20 to the side wall 24 in a substantially perpendicular relationship.

In operation the anchor crown is constructed by first providing the crown side walls with projecting members along opposite surface edges. The projection length for optimum coupling strength should be three times the thickness of the crown plate through which the projections are received. After the projections are

received through the apertures in the plates, the entire structure is held in place while a suitable type hammer or equivalent device applies a longitudinal stress force on the material which becomes deformed and expands about the aperture.

Various metals may be used in construction of this anchor; however, aluminum has been found most desirable due to its characteristics which are advantageous for a lightweight anchor having improved strength and holding power. Aluminum is sufficiently malleable to provide rigid coupling of the crown plate, thus creating an anchor that is stronger than a comparably-sized, welded anchor. The crown plates and side walls may be constructed by any standard process and may be stamped or molded. The remaining anchor components are coupled to the crown and each other using known techniques.

The instant invention has been shown and described herein in what is considered to be the most practical and preferred embodiment. It is recognized, however, that departures may be made therefrom within the scope of the invention and that obvious modifications will occur to a person skilled in the art.

What is claimed is:

1. In a twin-fluke anchor having a crown, a pair of flukes coupled to said crown, a shank moveably coupled to said crown, and a stock coupled to said crown, the improvement wherein said crown is comprised of:

- a top plate having a plurality of apertures through its thickness,
- a bottom plate having a plurality of apertures through its thickness,

- a pair of parallel side plates, each side plate having a plurality of projections along top and bottom edge faces, said top side plate projections engaged through said top plate apertures, said bottom side plate projections engaged through said bottom plate apertures, said top and bottom plate projections having end portions enlarged greater in diameter than the diameter of said apertures, whereby the said plates are rigidly coupled to said top and bottom plates; and

shank stopping means coupled to said shank, for engagement with the leading edge of one of said side plates, to limit the pivotal motion of said shank.

2. An anchor crown as in claim 1, wherein: said plate edge faces having edge projections are tapered with respect to each other on each plate.

3. An anchor crown as in claim 1, wherein: said plates are aluminum.

4. An anchor crown as in claim 1, wherein: the length of said edge face projections from said edge face is at least three times that of said plate aperture depth.

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