

March 23, 1971

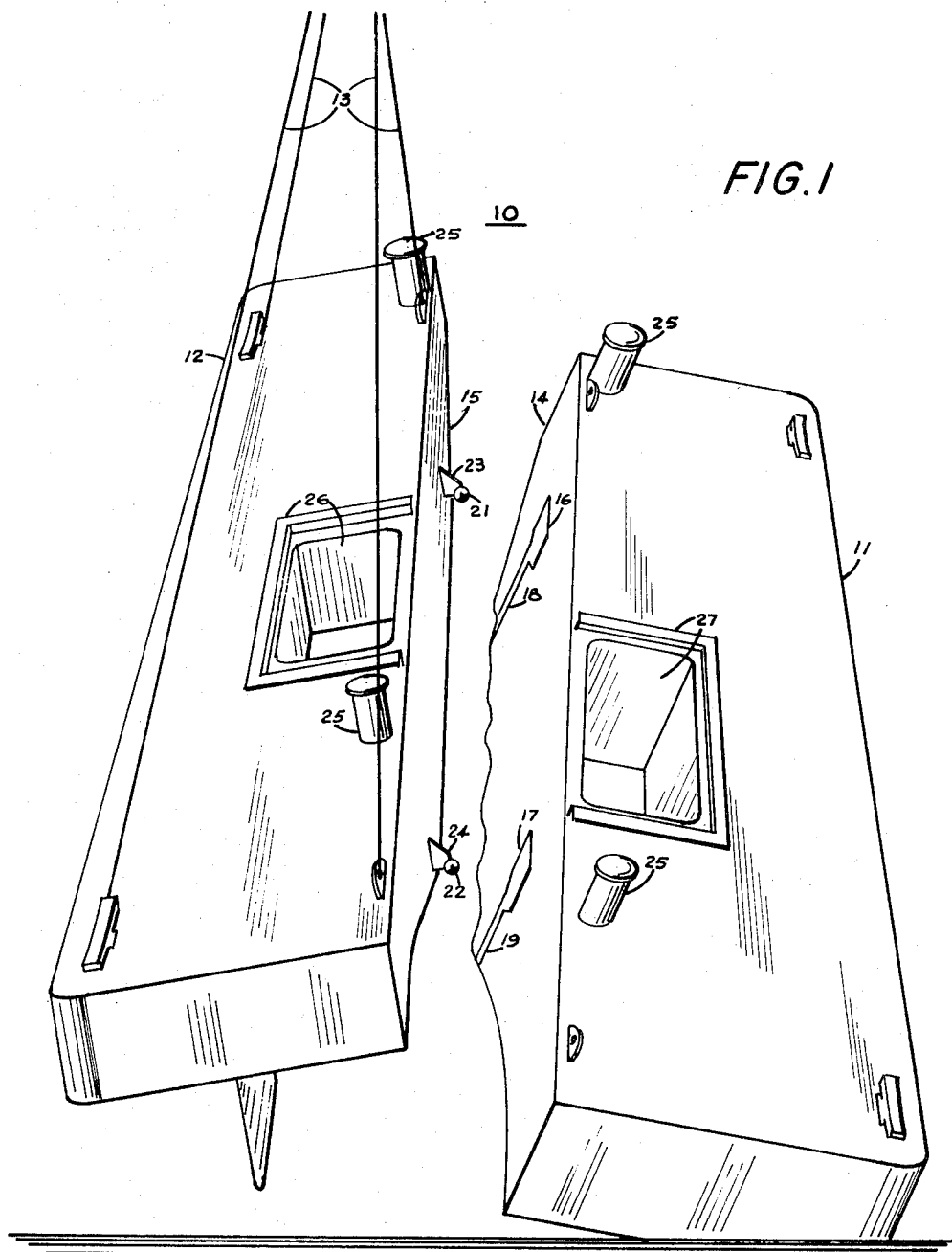
S. SCHOUSBOE

3,572,277

LENGTHWISE DIVISIBLE BOAT

Filed March 28, 1969

4 Sheets-Sheet 1



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FIG. 2

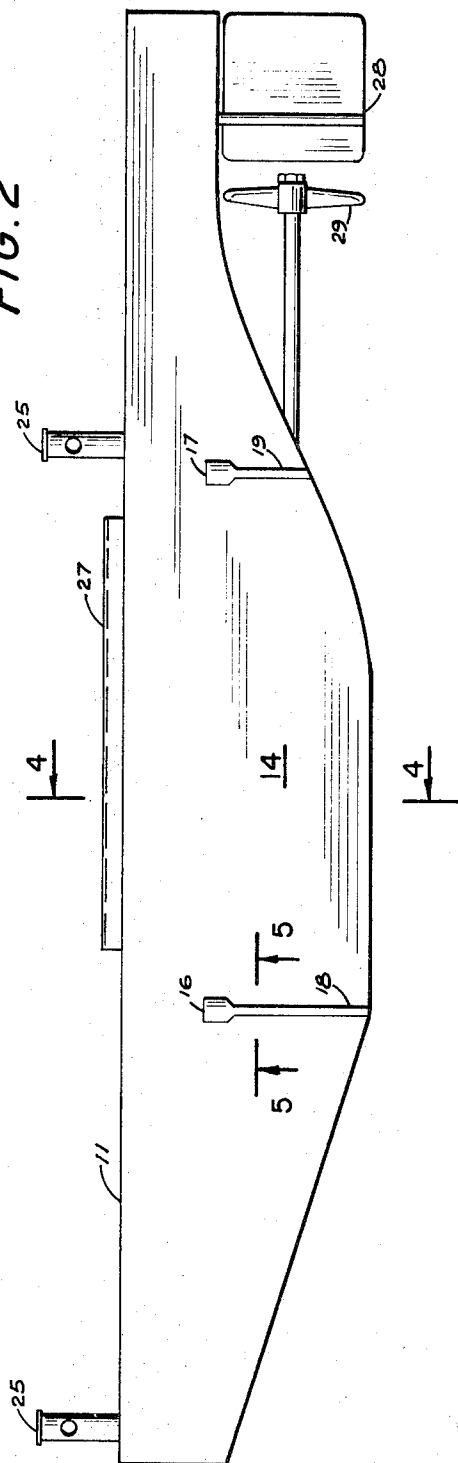
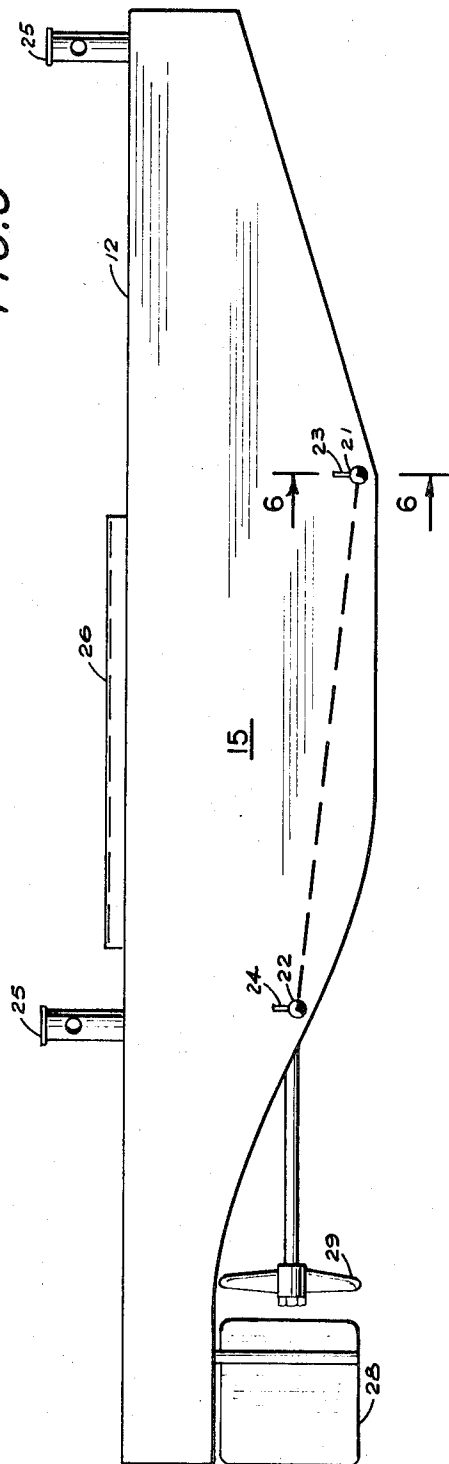


FIG. 3



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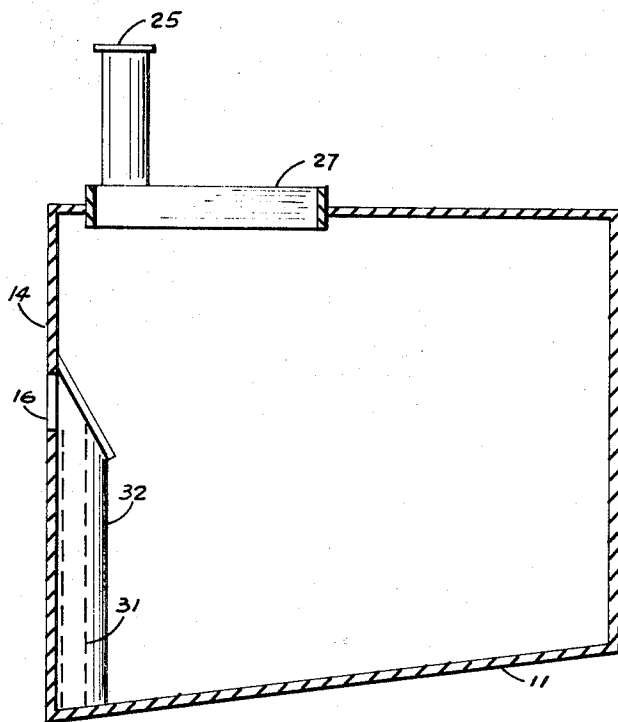


FIG. 4

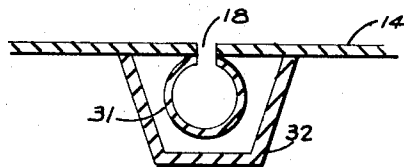


FIG. 5

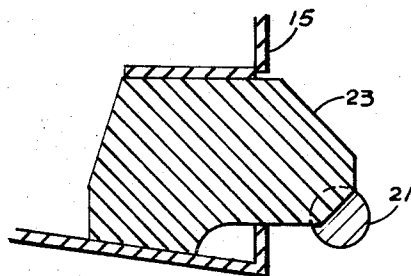


FIG. 6

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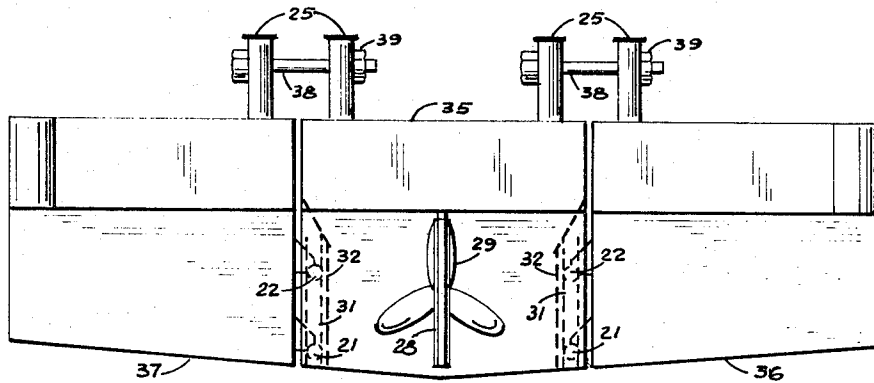


FIG.7

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3,572,277

LENGTHWISE DIVISIBLE BOAT

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U.S. Cl. 114—77

8 Claims

ABSTRACT OF THE DISCLOSURE

A boat is provided which is divisible into two or more separately buoyant sections lengthwise. These sections are connected by means of a mating ball and channel connecting device in opposing walls of the sections, and posts at the top of the walls which bear the main load in tension. The sections are designed to cant outwardly from each other when separate so that most of the load when connected is borne by the posts at the top.

The present invention is concerned with a boat for use in commerce, which can be split up and transported by land to another point of use.

It has long been desired in the inland marine area to have a boat which was useful for hauling of heavy freight, oil, and other activities, and yet could be trucked quickly overland to another point of use. The main problem is that in order to be conveyed overland from one point to another without requiring special permits, a boat must be no wider than nine feet in two of its three dimensions. However, a boat of such dimensions lacks utility generally in the hauling of freight, oil, and for other commercial purposes. Efforts have been made to provide boats in relatively small pieces, linked together end-to-end by flexible connections, so that the total vehicle is substantially longer than the individual components. These efforts have met with the serious drawback that such a boat flexes severely in the lengthwise direction, generally resulting in the destruction of the connecting member.

The present invention deals with the problem by providing a marine vessel which is divided into a plurality of sections along vertical planes parallel with the line of travel. These sections are connected by a connection designed such that most of the tension is borne by tension members on the deck of the vessel with only occasional tension on the lower connecting members. Each of the sections measures less than nine feet in two of its three dimensions, and can be lifted out of the water and trucked overland rapidly to a new point of use.

Accordingly, it is an object of the invention to provide a marine vessel divisible into sections which can be trucked overland without inconvenience.

It is further an object of the invention to provide a marine vessel composed of sections connected by tension members at the top deck of the vessel, wherein the remainder of the vessel connection rests under compression under most circumstances.

It is yet another object of the invention to provide a marine vessel in sections which can be interconnected quickly and conveniently with the aid of ordinary crane equipment.

It is still another object of the invention to provide a marine vessel composed of sections which tend to close up automatically into a closed position upon connection.

These and other objects will become apparent upon consideration of the following description when taken with the accompanying drawings.

FIG. 1 shows a pictorial representation of the two halves of a sectional marine vessel according to the invention being assembled in the water.

FIG. 2 shows a side view of the right hand section shown in FIG. 1.

FIG. 3 shows a side view of the left hand section of the vessel shown in FIG. 1.

FIG. 4 shows a sectional view of the right hand side of the boat taken along the lines 4—4 in FIG. 2.

FIG. 5 shows a detailed sectional view of the channel connection according to the invention taken along the lines 5—5 in FIG. 2.

FIG. 6 shows a detailed sectional view of the mating member according to the invention taken along the lines 6—6 in FIG. 3.

FIG. 7 shows an alternative embodiment of the invention having three sections taken from an end view thereof.

Turning now to FIG. 1, there is shown a pair of hull sections of a push boat 10 of the type used for pushing strings or dry and liquid cargo barges up a river. The right hand section 11 is floating in the water. The left hand section 12 is being lowered by cables 13 into connection with it. At the point where the boat divides in two, each section has a vertical wall, numbering 14 on the right hand side and 15 on the left hand side. These walls exactly match when connected.

Located in the right hand wall are a pair of openings 16, 17. These openings in the wall connect with slits 18, 19 running down the side of the wall 14 to its bottom edge. Located approximately at the lower edge of wall 15, and extending outwardly therefrom, are two steel balls 21, 22. These are connected firmly to wall 15 by narrow, but rugged, steel strips 23, 24. The cables 13 move section 15 over to the point where ball 21 passes through opening 16 from which it descends on the opposite side of wall 14 through a channel to be seen later. Slit 18 is not wide enough to permit passage outwardly of ball 21 once it has descended below opening 16. Strip 23 extends outwardly through slit 18. After ball 21 has descended part way below opening 16, ball 22 is maneuvered into opening 17. Ball 22 then descends through a similar channel on the opposite side of wall 14 until both balls have arrived at the bottom of their respective channels.

It will be noticed in FIG. 1 that section 11 floating has a natural tendency to cant outwardly at its upper edge away from the left hand section 12. This is due in considerable part to the shape of its bottom, which slopes upwardly toward the right hand edge of the boat. Section 12 is similarly shaped in the opposite direction and would tend to cant outwardly to the left when floating separately. However, when balls 21 and 22 have passed through openings 16, 17, respectively, and are descending through the channels on the opposite side of wall 14, pressure which exists on the bottom portion of walls 14 and 15 below balls 21 and 22 forces the two walls to come together for a reason which will be illustrated in more detail later. As a consequence, when balls 21, 22 arrive at their respective resting places, sections 11 and 12 have straightened up, and walls 14 and 15 are in substantially complete contact, with tension on connecting strips 23, 24, and pressure on the bottom portions of walls 14, 15.

Noted on the respective decks of the two sections 11 and 12 are two pairs of matching posts 25. These posts are short and firmly anchored to their respective frameworks and have openings in them which will be illustrated later, for the insertion of crossbars. After the two sections 11 and 12 have straightened up, and walls 14 and 15 have come in substantially complete contact, the crossbars are inserted in posts 25 and are tightened to bear a strong tensile load. At this point, then, there is a strong tensile load on each of the posts 25 and the connecting cross-

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bars, and pressure on the bottom portions of walls 14 and 15. By the tightening of the tensile loads on posts 25, all of the tensile load on connecting strips 23, 24 has been removed.

As the boat travels, there will occasionally be surges of waves which will tend to put a tensile load on the bottom of the boat. However, because there is a positive pressure normally on the bottom edges of walls 14 and 15, the disturbances will have to be greater than a certain minimum value to put any tensile load on connecting members 23, 24, and only a very serious disturbance will put any substantial load on these members. Because the boat is still relatively narrow, being less than 18 feet, it is exceedingly unlikely that the boat would encounter a disturbance sufficient to cause a tensile load on members 23, 24 to rupture them.

Located on the respective decks of sections 11 and 12 are deck openings 26, 27. These deck openings are constructed so as to form a connection for a superstructure to be placed on the deck of the boat 10 after its two sections are joined. However, this superstructure, which usually comprises a cabin or boathouse, forms no part of the present invention and is not shown.

FIGS. 2 and 3 show more clearly the manner in which the inner opposing walls are constructed. Because ball 21 is lower than ball 22, it fits first into opening 16. When it has lowered part way through, ball 22 comes into position to enter opening 17. Then both descend to the bottoms of their respective channels. In FIG. 3 a dotted line is indicated between balls 21 and 22. All of the portion of wall 15 below this dotted line will press on opposing wall 14 after balls 21 and 22 are inserted in their respective openings. This pressure will cause walls 14 and 15 to come together and close up.

Also shown in FIGS. 2 and 3 are a conventional rudder 28 on each section, and a conventional propeller 29. Each propeller 29 is powered by a conventional motor contained in its respective section.

In FIGS. 4 and 5 are shown in more detail the channels through which balls 21 and 22 descend. In FIG. 4, channel 31 is identified in dotted line as being inside baffle 32. In FIG. 5 it is seen that channel 31 is cylindrical and vertically placed immediately behind slit 18. Cylindrical channel 31 has a slit which is a continuation of slit 18 in outer wall 14. Baffle 32 is placed slightly behind channel 31 and is completely sealed to the wall at top, sides, and bottom so as to isolate the entire interior watertight portion of section 11 from the water in channel 31. In FIG. 6 is shown a cross-section of ball 21 connected to wall 15 by a connecting strip 23, which is sufficiently narrow to be able to slide through slit 18 without interference. Ball 21 is of an appropriate size to slide through channel 31 without binding, but is too large to pass outwardly through slit 18 except through opening 16. It may also be seen in FIG. 4 that section 11 is shaped with a rise on the bottom toward the outer edge of the section. Section 12 is shaped in the same manner. This will cause both sections when floating separately in the water to cant outwardly at their tops from each other, and will cause them when joined together to have tensile forces at their top and compressive forces at their lower edges.

In FIG. 7 is shown an alternative embodiment of the invention comprising a three section boat, composed of center section 35 and side sections 36, 37. Center section 35 has a side wall matching and opposing similar side walls in each of sections 36 and 37. Each of sections 36 and 37 is equipped with balls 21, 22 as before, which fit into channels 31 as before.

Also shown in FIG. 7 is the detail of the tension members on deck. Posts 25 are joined together by crossbars 38, which are locked together by any conventional means, for example, by threaded end and nut 39. It should be understood that any means sufficiently strong to lock crossbar 38 into post 25 will be adequate.

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In the embodiment of FIG. 7, propeller 29 and rudder 28 are contained in the center section, leaving the outer sections completely free for cargo. However, if desired, rudders or propellers, or both, may be placed in the outer sections rather than in the center section. As a general rule, however, it is extremely convenient to leave the outer sections completely free for cargo, leaving the center section available not only for the propulsion machinery, but for crew and living quarters as well. Optionally, outer sections 36, 37 may be removed in port entirely and shipped, cargo and all, to a remote destination to be unpacked. New matching sections may then be substituted for a return trip, or section 35 may be lifted out of the water and trucked back to its point of origin for joining with new cargo sections. Because of its convenience, the embodiment of FIG. 7 is adaptable to carrying oil, either crude or refined, for gasoline deliveries. However, the embodiment of FIG. 7 is shown in the same configuration of a barge pushboat as in FIGS. 1 through 3.

Each of the sections in each of the embodiments is designed to be made less than nine feet in width. Since it is also less than nine feet deep, each section may be hauled out of the water by crane and transported to another location as needed by truck. A use which is particularly convenient for the invention is the pushing of barges of liquid or dry cargo through the inland waterway system. Customarily, long strings of barges are strapped together and are pushed at their rear end by a pushboat. In the past, this pushboat then had to travel at an equally slow speed back along the river or other waterway to its point or origin to pick up new loads of barges and cargo. With the present invention, the pushboat and the barges, each of which also may be individually less than nine feet in width, may all be hauled out of the water at their point of destination, packed on trucks or freight cars, and shipped back to their point of origin quite rapidly in comparison with the standard rate of speed on the waterway. By this means, a substantial portion of the time ordinarily taken in returning the equipment to the point of origin is saved, and far more effective use of equipment is made.

It will be seen that the foregoing invention provides a boat which is capable of far more efficient use in our inland waterway system than has previously been known. It will be understood that suitable variations in the equipment may be employed without departing from the scope of the claimed invention.

What is claimed is:

1. A marine vessel having an intended line of travel, being divisible into at least two separately watertight buoyant sections along at least one vertical plane parallel to said intended line of travel, wherein at each division there are matching opposing walls on each section, and having means to connect said sections when in use, comprising:

- a channel connected to an opening in a wall in one section,
- a mating member connected to the opposing wall below its top in the adjacent section which fits into said channel, and
- a locking means on the deck of said vessel holding said opposing walls together after said mating member is fitted into said channel.

2. A marine vessel as in claim 1, wherein said channel is vertical with said opening at its upper end, and said mating member rests adjacent the lower edge of the wall which it fits.

3. A marine vessel as in claim 1, wherein there are at least two mating members in a wall fitting into at least two channels in an opposing wall.

4. A marine vessel as in claim 3, wherein there are two mating members in a wall, and wherein a portion of said wall extends below a line between said mating members.

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5. A marine vessel as in claim 4, wherein there are two sections equal in width, each when floating separately having a cant with its top edge away from the other.

6. A marine vessel as in claim 4, wherein there are three sections, the two outer sections when floating separately having a cant with their top edges away from the center section.

7. A marine vessel as in claim 1, wherein said mating member comprises a connecting strip attached to said wall and perpendicular thereto and a ball attached to said connecting strip, and said channel is a cylinder with a slit therein also being a slit in said wall, said channel being isolated from the interior of said section.

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8. A marine vessel as in claim 1, wherein said locking means comprises a pair of posts on the deck of said vessel adjacent said opposing walls, each post having a horizontal hole therethrough, and a crossbar fitting through said holes.

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TRYGVE M. BLIX, Primary Examiner