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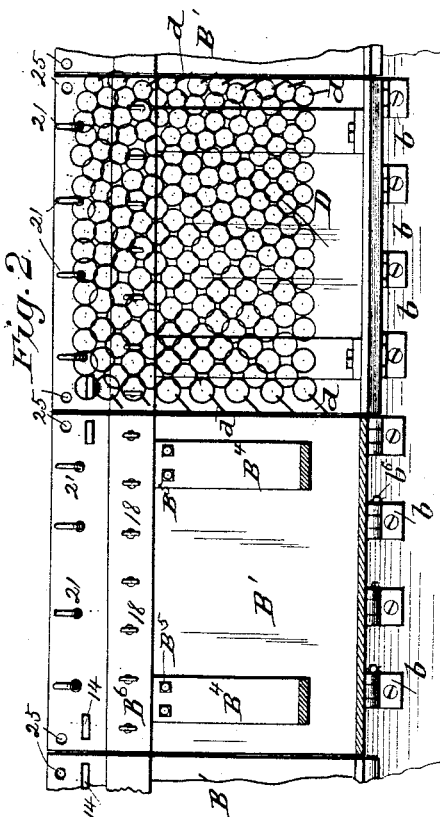
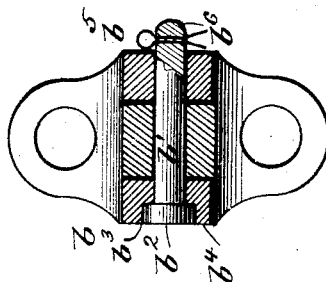
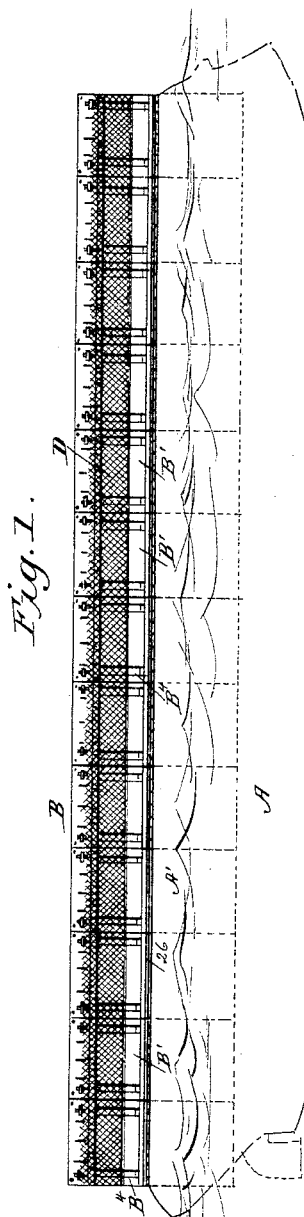
3 Sheets—Sheet 1.

I. B. ABRAHAM.

ADJUSTABLE AND REMOVABLE ARMOR FOR SHIPS.

No. 419,301.

Patented Jan. 14, 1890.



WITNESSES:
Fred G. Dieterich

Frederick H. Stearns,

INVENTOR:

Isaac B Abraham

BY

Maria L.

ATTORNEYS

(No Model.)

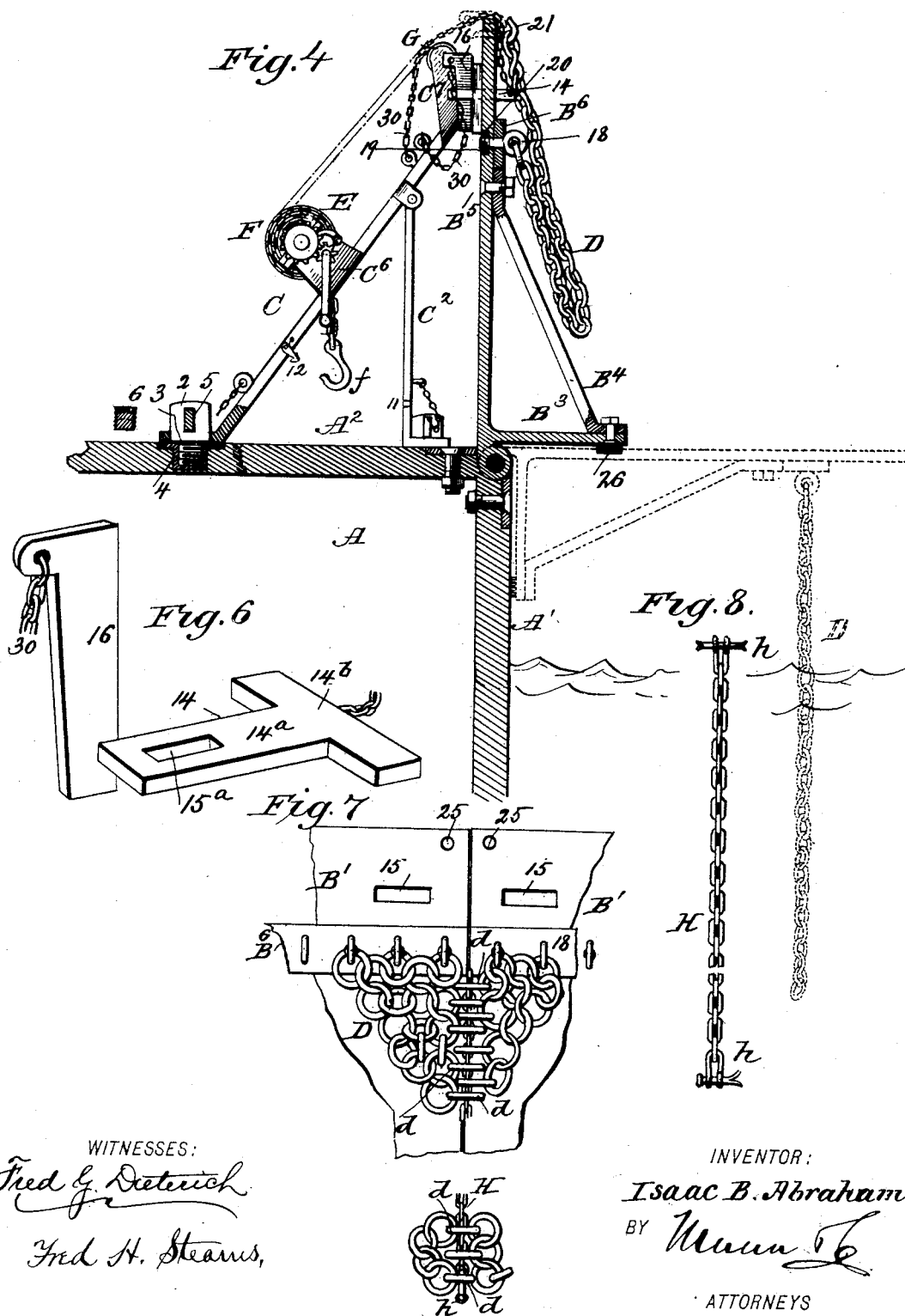
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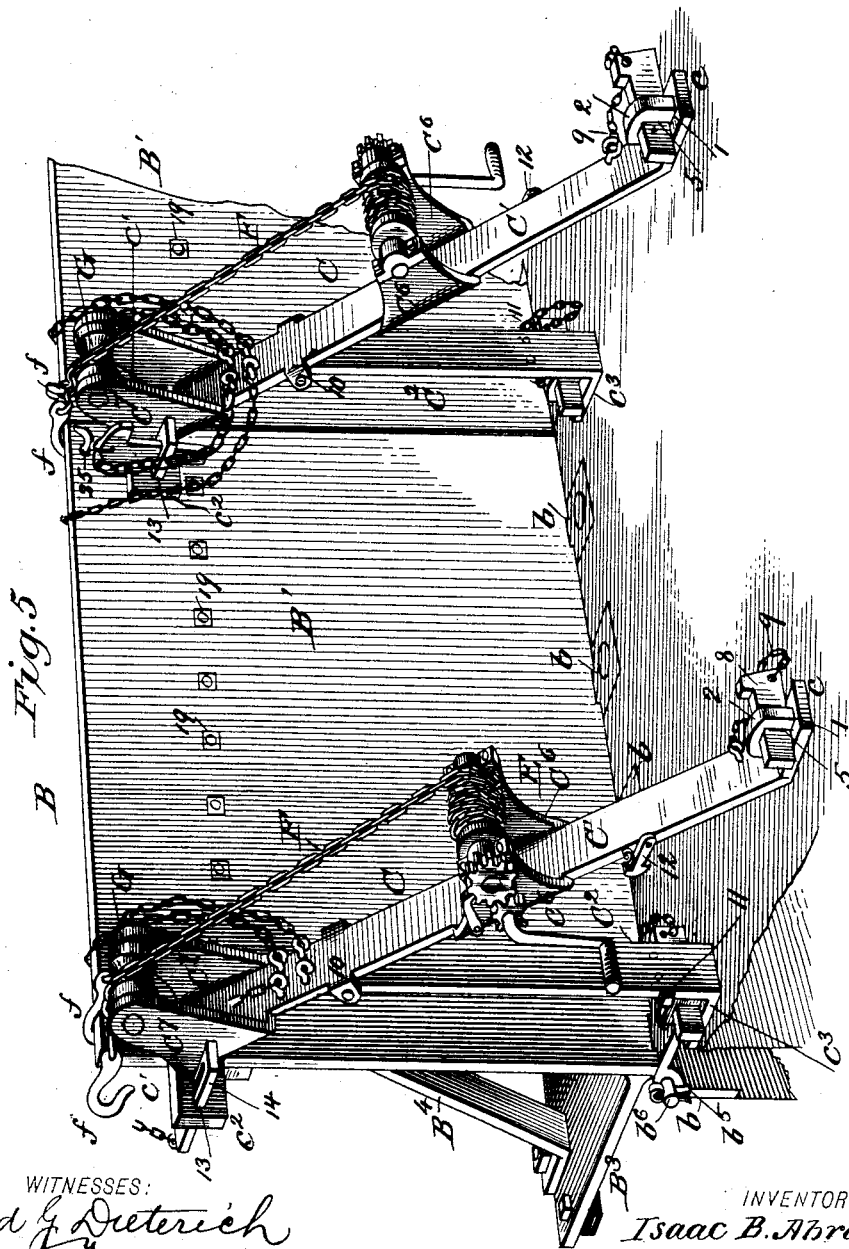
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INVENTOR:
Isaac B. Abraham
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UNITED STATES PATENT OFFICE.

ISAAC B. ABRAHAM, OF SAN FRANCISCO, CALIFORNIA.

ADJUSTABLE AND REMOVABLE ARMOR FOR SHIPS.

SPECIFICATION forming part of Letters Patent No. 419,301, dated January 14, 1890.

Application filed September 10, 1889. Serial No. 323,563. (No model.)

To all whom it may concern:

Be it known that I, ISAAC B. ABRAHAM, of the city and county of San Francisco, and State of California, have invented a new and useful Adjustable and Removable Armor for Ships, of which the following is a specification.

The nature of my invention consists in combining with a vessel a gunwale formed of a series of sections, hinged at their lower ends to the deck of the vessel, which are adapted to be elevated to form an armor against attack, and also form a protection against the waves passing over the deck during storms, &c.

To this end my invention consists in combining with a swinging gunwale formed of sections a series of portable braces, which are detachably secured to the ship's deck, which form braces to secure said gunwale-sections when in their vertical positions, and which serve as derricks for raising said gunwale-sections when they are in their lowered positions.

It also consists in combining with the said sections a series of chain armors secured thereto, which are suspended to one side of the vessel when the gunwale-sections are lowered.

Finally, my invention also consists in certain novel features of construction and peculiar combination of parts, all of which will hereinafter be fully described in the annexed specification and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improvement as applied to a vessel. Fig. 2 is a detail side view, partly in section, of two of the gunwale-sections. Fig. 3 is a section of the peculiarly-constructed hinges used to secure said sections to the vessel. Fig. 4 is a transverse section of one of the gunwale-sections, showing its connection to the deck and the portable brace for holding said section in position. Fig. 5 is a perspective view, illustrating the portable braces, the gunwale-sections, and their connections to each other and to the deck; and Figs. 6, 7, and 8 are detail views, which will hereinafter be specifically referred to.

In the accompanying drawings, A indicates the vessel, A' the side, and A² the deck thereof.

It will be understood that my improvements are more especially adapted for use in connection with iron-clads, and that the material of which the several parts are constructed is iron or steel.

B denotes the gunwale, which is formed of a series of sections, usually about six feet high and six to eight feet long, said sections B' being hinged at their lower ends to the deck, said hinges b being so constructed and attached that when the several sections are elevated no openings are left between the sections B' and the deck, where the water might pass through when a high wave may dash against the vessel. As it is necessary at times when any of said sections are broken or disabled that they be removed without disturbing the adjacent sections, I construct the said hinges in the manner most clearly shown in Figs. 2 and 3 of the drawings, by reference to which it will be observed that I form the hinges b at suitable distances apart, and provide the bolts or pintles b' with heads b², fitting sockets b³ in the eye portions b⁴ of the hinges, and with spring-keys b⁵, which pass through the projecting ends b⁶ or the bolts b'. By this construction it will be seen that by arranging the hinges apart the bolts b' may be quickly withdrawn after the spring-keys b⁵ are taken out and the broken section removed. To support the said gunwale-sections in their vertical position and to afford a convenient means for elevating said sections, I provide a series of portable braces C, the construction and operation of which are most clearly illustrated in Fig. 5 of the drawings. By reference to said figure it will be seen that such brace C consists of an incline bar C', provided with a foot-piece c, and a head portion c', formed with lateral vertically-disposed wings c² c². In practice I arrange one brace C at the meeting ends of two of the sections B', so that the strain of each section will be against two of the braces C. To admit of the sections B' being quickly attached to or detached from the braces C, and also provide means whereby said braces may be quickly detached from connection with

the deck, I form the said foot-piece with an elongated slot 1, in which fits the elongated head 2 of a securing-bolt 3, the lower screw-threaded end of which fits in a socket-plate 5, secured in the deck, as shown in Fig. 4, a screw-plug 6 being arranged to fit the sockets 4 when the brackets are removed. Each head 2 of the bolts 3 is provided with a transverse aperture 5, through which a wedge-pin 8 is driven, which serves to hold the said foot *c* securely in place, said wedge-pin being attached to the bar *C'* by a chain 9, to prevent its being misplaced. As an additional means for supporting the bracket-bar *C'* and securing it, I provide a bar *C²*, pivoted at its upper end to the bar *C'*, as at 10, its lower end being provided with a foot-piece *c³*, which is provided with securing devices precisely similar to those described for securing the foot portions *c*, and they therefore need no further description. One edge of the swinging bar *C²* is provided with a projecting lug 11, which engages a spring-catch 12, when the said bar *C²* is swung against the bar *C'* and held against the same when said parts are stowed away. By thus adding the swinging bar to the bracket *C* and securing it as shown great strength is added to the bracket. Each of the lateral wings *c²* *c²* of the heads *C'* *C'* of the brackets is provided with a horizontal elongated slot 13 13, through which and coincident slots 15 15 in the gunwale-sections *B'* are inserted locking keys or wedges 14 14, (shown in detail in Fig. 6,) which consist of the shanks 14^a 14^a and the transverse heads 14^b 14^b, said shanks 14^a being provided near their outer ends with elongated apertures 15^a 15^a, through which pass wedge-keys 16 16, and which serve to lock said sections to the braces *C*, as shown, said wedges and keys being provided with suitable chain connections 30 for holding them to the braces.

Each of the gunwale-sections *B'* is provided at its lower end with a forwardly and horizontally projecting portion *B³*, which is braced to the said sections by the diagonal brace-bars *B⁴*, the upper ends of which are securely bolted to the sections *B'*, as at *B⁵*, and also a strengthening-bar *B⁶*, secured upon the outside of the said sections, preferably by means of the ring-bolts 18 18, which pass through said bar *B⁶* and the section *B'*, and held in place by nuts 19 19, fitting in countersinks 20 20 in the rear face of said section *B'*, as shown. *D* denotes a chain armor, which is secured at its upper edge to the ring-bolts 19, its lower end being looped up when the vessel is not in action and suspended upon hooks 21 21, secured near the upper edges of the sections *B'*.

As it is necessary that means should always be at hand to elevate or lower the several gunwale-sections, either singly or collectively, I provide each of the braces *C* with a windlass *E*, mounted in wings *C⁶* *C⁶*, formed on the bars *C'* about centrally thereof, and to said windlasses I connect one end of a lifting-

chain *F*, which in operation passes over a guide-pulley *G*, journaled in vertical wings *C'*, formed on the bars *C'*, near the upper ends thereof, the free ends of said chain being provided with two gripping-hooks *f f*, as shown, which in practice engage the apertures 25 25, formed in the upper outer edges of the adjacent ends of the sections *B'*. It will thus be seen that when it is desired to lower any one or all of the gunwale-sections for action the lower end of the chain armor is first lifted from the hooks 21, connected with the windlass-chains *F*, and allowed to lower into the water, the hooks *f* of said chains readily releasing themselves from the chain-links when the end of the chain is lowered to its limits. The locking wedges and bolts 14 and 16 are then withdrawn and the hooks *f f* of the several chains *F F* inserted in the holes 25 25 and the sections *B'* *B'* then lowered to a horizontal position and flush with the deck, the extensions *B³* abutting against the sides of the vessel, said extensions being provided with a suitable buffer-rib 26, for a purpose well understood. The chains *F* are then disconnected from the sections *B*, the braces *C* are disconnected from the deck and stowed away, and the screw-plugs 6 then screwed into the sockets, thereby rendering a clear, smooth deck.

To guard against the attack of torpedo-boats and the like, it is necessary that the chain armor should be continuous. To this end I provide the meeting ends of said chains with loose links *d d*, through which I weave connecting-chains *H*, provided at their upper and lower ends with shackles *h h*, as most clearly shown in Figs. 7 and 8 of the drawings. In practice I may prefer to attach a suitable rope to one end of the chain *H* and weave it through the several loose links *d* when the chain is at its elevated or rest position, and connect said rope to the sides of the gunwale, so that when the chain *D* is lowered in position by pulling up the rope the chain *H* will readily pull through the several links until its lower shackle engages the lower link *d*, after which the upper end or shackle portion may be secured to hold said chain in position, thereby practically making the chain armor *D* a continuous chain.

From the foregoing description, taken in connection with the drawings, the advantages of my improvement will be readily understood.

It will be seen that when my improvement is applied to iron-clads, the decks of which usually are but three to four feet above the water-line, the height of the chain-sections need be but from eight to ten feet, thereby allowing from five to seven feet of said chain hanging in the water. It will also be observed that by arranging my chain armor as described, when the same is lowered in position it will be about five or six feet away from the side of the ship, thus affording through its own weight and flexibility and

the resistance of the water between it and the sides of the vessel a strong cushion-protection for the vessel when shells are directed against it.

5 While I have shown and described my invention as more particularly adapted for use in connection with a war vessel, I desire it understood that the chain armor may be omitted, and the peculiar arrangement of the
10 gunwale and the portable braces may be employed in connection with merchant vessels, as the said gunwale, while affording a great protection against high seas during storms, &c., can be readily lowered in position for
15 extending the deck when it is desired to unload the vessel in port. I also desire it understood that I do not wish to confine myself to the exact details of construction as to the locking and unlocking devices, as also to the
20 windlass mechanism, as these may be changed to various forms without departing from the broad idea of my invention. It will also be understood that instead of using hand-power to operate the windlass the said windlasses
25 may be connected with suitable steam, air, or hydraulic power.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

30 1. A gunwale for vessels formed of sections hinged at their lower ends to the deck of the vessel, provided at said lower ends with an outwardly-projecting portion B^3 , said projections B^3 adapted to support the sections when they are lowered to a horizontal position, and
35 means for raising and lowering said sections, substantially as shown and described.

2. A gunwale for vessels formed of a series of sections hinged at their lower ends to the
40 deck, flush there with said sections, provided at the lower edges with outwardly and horizontally projecting portions B^3 , braces B^4 , connected to said sections and projecting portions B^3 , and buffer-ribs secured upon the under
45 side of the said portion B^3 , all arranged substantially as and for the purpose described.

3. An improved armor for vessels, consisting of a gunwale formed of a series of sections hinged at their lower ends to the deck,
50 a series of chain armors D , connected at their upper ends to the outer faces of the gunwale-sections, the lower ends of said chains adapted to swing into the water when said gunwale-sections are lowered to a horizontal position,
55 and means for raising and lowering said gunwale-sections, substantially as shown and described.

4. The combination, with the gunwale-sections B' , hinged to the outer edge deck, as
60 shown, of a series of portable braces detachably secured to the deck, and the locking devices for detachably securing said gunwale-sections to the braces, substantially as shown and described.

65 5. The combination, with the swinging gunwale-sections provided with elongated open-

ings, as 15 15, near their upper meeting edges, of a series of portable braces detachably secured to the deck and disposed one at the meeting edges of two of the swinging sections
70 B' , said braces provided with lateral wings at their upper ends having elongated openings aligning the openings 15 in the sections B' when in vertical position, and the keys 14 and wedges 16 for locking the said sections
75 to said braces, substantially as shown and described.

6. The combination, with the swinging gunwale-sections, constructed as described, and hinged to the deck, as shown, of the portable
80 braces C , consisting each of the bar C' , provided with foot-piece c , and a head c' , having lateral slotted wings $c^2 c^2$, said foot c adapted to be detachably secured to the ship's deck, said wings adapted to be detachably secured
85 to the meeting ends of two of the sections B' , and means for connecting said wings to the sections, substantially as shown and described.

7. The combination, with the swinging gunwale-sections B' , of the portable braces C , each consisting of a main bar C' , provided with a foot-piece c , a head portion c' , having lateral wings $c^2 c^2$, a supplemental bar C^2 , pivoted at
90 its upper end to the bar C' , its lower end provided with a foot-piece c^3 , all arranged substantially as shown and described.

8. The combination, with the deck provided with a series of screw-threaded sockets and the swinging gunwale-sections B' , of the portable
100 braces detachably secured at their upper ends to said gunwale-sections, the lower ends of said braces provided with slotted foot-pieces $c c^3$, and the locking devices for securing said foot-pieces $c c^3$ to the deck, said devices each consisting of a screw-bolt provided with an elongated head fitting the elongated slot 1 in said portions $c c^3$, the screw portion
105 of said bolts fitting the screw-sockets in the deck, said head provided with an elongated slot, and a wedge adapted to pass through said slot and lock the several parts in position, substantially as shown and described.

9. The combination, with the swinging gunwale-sections, of a series of portable braces C ,
115 secured to the deck adjacent the inner wall of said sections, each provided with windlass mechanism, and a guide-pulley secured thereon, lifting-chains F , secured at one end to said windlasses and provided with grapples $f f$ at
120 their outer ends adapted to engage the swinging sections, and means for operating the windlasses, substantially as and for the purpose described.

10. The combination, with the swinging gunwale-sections B' , hinged to the deck, as
125 shown, a series of chain armors D , suspended from the outer faces thereof, provided with loose links d at their meeting edges, of a supplemental chain connection adapted to be
130 woven through said loose links d for connecting said chain-sections, and means for rais-

ing and lowering said chain-sections and the gunwale-sections, substantially as shown and described.

11. The combination, with the vessel, of a
5 gunwale formed of a series of sections hinged at their lower ends to the outer edges of the deck, said sections each consisting of the body B', the outwardly-projecting portion secured upon the lower front face of said body B', the
10 brace B⁴, connected at its lower end to the outer edge of said projecting portion B³ and

at the upper end to the body portion, the strengthening-bar B⁵, secured upon upper front face of said body, the ring-bolts B⁶, secured upon the front face of said bar B⁵, and 15 means for raising and lowering said swinging gunwale-sections, substantially as shown and described.

I. B. ABRAHAM.

Witnesses:

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