Feb. 25, 1941. W. E. ELLING 2,233,254

LIFEBOAT CONSTRUCTION

Filed Dec. 31, 1937

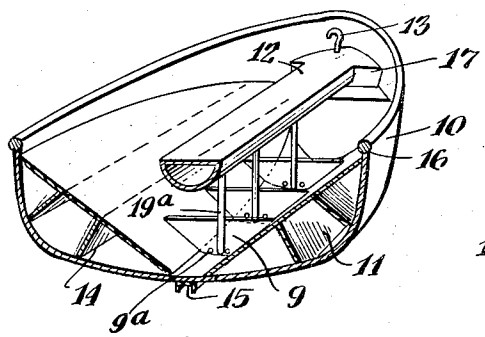

Fig. 1

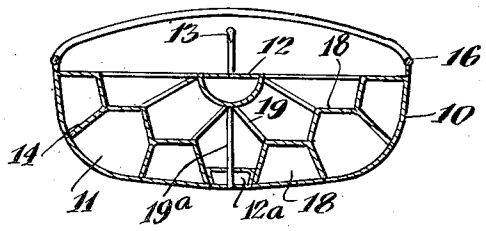

Fig. 2

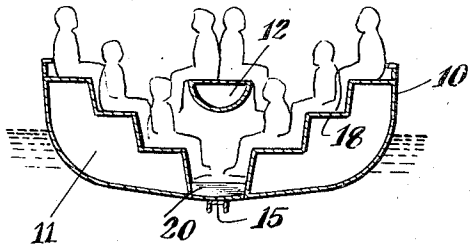

Fig. 3

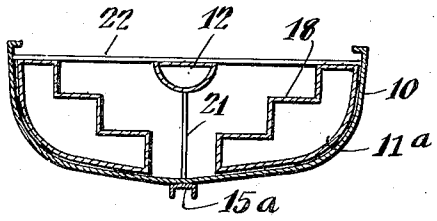

Fig. 4

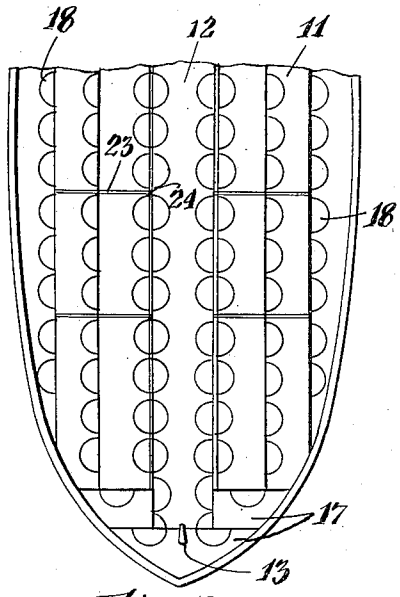

Fig. 5

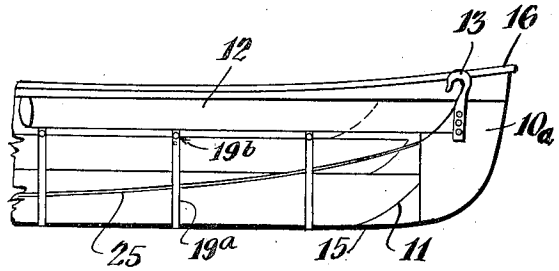

Fig. 6

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LIFEBOAT CONSTRUCTION

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3 Claims. (Cl. 9—3)

This invention relates to boats, especially to a novel and improved lifeboat construction, and it is one of the objects of the invention to provide a new method of constructing lifeboats.

The following considerations will be valuable for the understanding of my invention:

(a) Lifeboats are given a greater stability by automatically forcing incoming water to gather and remain near the center and at the lowest point of the boat.

(b) The tenacity of metallic lifeboats is greatly augmented by using the walls of air casings as longitudinal strengthening members for the lifeboat.

(c) A lifeboat must be constructed strong enough to be capable of bearing, when suspended from two ship's davits, and with the hoisting points at or near the ends of the boat, the tremendous load represented by the great number of people occupying the boat (about one person for every 10 cubic feet capacity), and must naturally be fully strong enough to serve its purpose when in the water even under the worst weather conditions.

Before the introduction of so-called "gravity davits" constituting the best available lifeboat launching apparatus at present, rotary davits or mechanical davits were used, but the same had a limited efficacy only, and boats of 30 feet in length and 75 persons capacity were considered as being already too large to be handled with safety in an emergency.

Gravity davits which are now in general use on the larger ocean liners can be built strong enough to launch lifeboats of any size, and it is one of the objects of my invention to provide lifeboats which are light and still longitudinally strong enough and of a tenacity to be capable of bearing more than 150 pounds for every 10 cubic feet of the boat's cubic capacity.

(d) In accordance with the lifeboat regulations, one person is allowed for every 10 cubic feet of the cubic capacity of a lifeboat, and a seat must be provided for every person, thus allowed. It is another object of this invention to provide an arrangement of air tanks and stiffening members which will present seats for a maximum number of persons. A further advantage of my invention is the arrangement of a great number or percentage of the number of seats at or near the water line which will provide for added stability of the boat when afloat.

Still further advantages of such air tank arrangement are the provision of an abundance of air tank capacity which will greatly exceed the required air tank space for the older class "A" boats, which was one cubic foot for every person allowed, plus the air tank space required to float the boat.

(e) The greatest stress on the structure of a lifeboat is imposed at the time during which the boat, when fully loaded, it is lowered to the water and suspended from the ship's davits with the hoisting points at the ends of the boat, and while all this stress is taken up with the older class "A" lifeboats by the shell, the plating of these boats is liable to spring a leak under the great strain. In order to avoid this, I provide according to the present invention a combination of various longitudinal stiffener members.

I connect longitudinal web girder plates between the inner and outer hulls where they will serve as division plates for air tanks placed so that in a transverse section they radiate from a point within the hull which is near the level of the hoisting points and thus provide together with other members a maximum of longitudinal stiffness.

(f) It is a well known fact that a moving load in a floating vessel is dangerous to the stability of the vessel, and a rocking lifeboat when partly filled with water will capsize easily by the momentum of the bilge water splashing from side to side. If a boat is heeled by an external force to any angle, the center of buoyancy is shifted to the center of gravity of the new volume displaced, and if the unavoidable bilge water is allowed during this inclination to move also towards the side and thus diminishing the righting moment of the downward force through the center of gravity and the upward force through the new center of buoyancy, the boat will have little or no statical stability and may easily capsize. It is therefore an important part and object of this invention to provide means for using the bilge water to stabilize a floating lifeboat, by having a V-shaped inner hull with straight or zig-zag sides between the keel and gunwales, which keeps the water near the centerline over the keel and prevents the center of gravity, including bilge water to pass or come close to the transverse center of buoyancy in a rocking boat.

(g) Experience tells us that it is extremely difficult to bail out a floating lifeboat once it has been flooded up to the level of the gunwales. This is because of its unstable condition and the impossibility to keep the boat on an even keel for any length of time.

It is part of this invention to provide means for partly draining flooded lifeboats of the class

1A or Standard Type through scupper pipes at the center of the boat.

The air tanks in a boat of this invention provide an excess of buoyancy over and above the weight of the boat filled with water and the passengers.

Vertical pipes at the center line of a boat with an open-to-the-sea connection to the keel will have nearly constant water level inside when the boat is rocking The pipes extend up to the normal gunwale level where they serve as scuppers for all water inside the boat above the sea level when the boat is lifted by its excess of buoyancy The raised gunwales of the boat will now be far enough above the sea level so that the bailing out of water below the top of the pipes can be readily accomplished by a pump or by hand. Check valves in the pipes keep sudden waves out.

(*h*) Since internal combustion engines, Diesel engines or other mechanical means are now more frequently used as propelling means for lifeboats, transverse seats or thwarts for the oarsmen may be replaced by narrow braces, and it is also one of the objects of this invention to arrange all seats longitudinally except transverse and end seats in order to attain a maximum of the much needed longitudinal strength with a minimum of material and weight by combining or making up the necessary seats and airtanks with additional strengthening girders.

Another object of my invention resides in the increase of the air tank and seating capacity of lifeboats by suitably constructing and arranging the air tanks and seats.

In accordance with this invention, the large air tank capacity and the maximum number of seats is obtained by placing the inner hull which forms the seats so that in the midship section a straight line on each side of the boat from the keel to the gunwales will cross each of the seats.

The inner hull will thus enclose in a boat with normal deadrise of 1 inch per foot half beam an air tank space of more than 35 per cent of the area of the mid-ship section.

A further object of this invention is the provision of longitudinally arranged seats in lifeboats preventing the passengers from being thrown transversely or laterally to and fro when rocking in a sea or from moving deliberately in anxiety to one side, which would render the boat unstable and make it liable to capsize.

A still further object of my invention is the provision of a longitudinal girder placed between the hoisting points of the boat to ensure longitudinal stiffness and to counteract the tremendous strain experienced when the boat is being lowered with a full load of passengers.

Still another object of the invention is the arrangement of the interior structure of the boat in such a way that the presence of water in the boat, which in most cases is unavoidable, will rather add to its stability instead of diminishing the same, because the water is forced to remain in a narrow channel near the keel of the boat because of an inner hull leaving a prismatic open space, and is thus counteracting any rocking movement of the boat.

Transverse bulkheads with limber holes or scuppers at the bottom serve to slow down the fore and aft movement of the bilge water.

The lifeboats built heretofore usually had most of their seats arranged transversely, and a strong keel and gunwale construction was necessary to insure longitudinal stiffness against sagging and bending while the boat was fully loaded and suspended from the davits.

According to this invention transverse braces connect the sides of the boat and it is thus possible to arrange most of the seats in fore and aft direction and to make them part of the air tanks, and this arrangement, on account of the step-like or zig-zag section of the air tank plates, will add materially to the much desired longitudinal strength and tenacity of the hull, and at the same time will give a maximum of air tank space formed between the seats and the shell of the boat.

The advantages of arranging longitudinally extending seats stepping up from near the center line at the keel towards the gunwale of the boat are numerous. For instance persons, when entering the lifeboat, will naturally first occupy the lower seats in the boat, and thereby bring their weight near the center line, and this will add to the stability of the boat both, in the suspended and in the floating condition. Furthermore, if a boat constructed according to my invention is partly filled with water by waves breaking over it, the water will add to the stability of the boat instead of diminishing the same, because the water will be compelled to stay near the center line at the deepest part of the boat. Another advantage of my invention resides in the possibility of utilizing the space between and above the innermost side seats by arranging therein a longitudinal tank which again offers a number of additional seats and also serves as a longitudinal strengthening member, and also serves as a longitudinal compression member of the girder being formed together with the keel, tension rod and braces.

From the above it will be evident that in the construction of a lifeboat according to this invention, a considerable amount of material will be saved, and the weight of the boats reduced, while the lifeboat nevertheless will have a superior strength as compared with the ordinary lifeboats.

These and other objects and advantages of my invention will become more fully known as the description thereof proceeds, and will then be more fully defined in the appended claims.

In the accompanying drawing forming a material part of this disclosure:

Fig. 1 is a fragmentary, sectional view of a lifeboat constructed according to my invention.

Fig. 2 is a cross-section through a lifeboat showing the longitudinally extending built-in air tanks.

Fig. 3 is a diagrammatic illustration of the seating arrangement.

Fig. 4 is a cross-section through a lifeboat with portable side air tanks, shaped to form longitudinal seats, and a center line girder and tank.

Fig. 5 is a fragmentary top plan view of a lifeboat indicating the space occupied by each person.

Fig. 6 is a fragmentary side view of the boat showing tanks and seats, and a center line girder formed by the center tank and keel with combination braces and scupper pipes and tension rods between.

As illustrated, the outer hull or body **10** of a lifeboat constructed according to my invention has a plurality of longitudinally extending side air tanks **11**, **11***a* installed therein, and a centrally located and lengthwise extending air or supply tank **12**. A hook **13** for the attachment of the hoisting cables is secured to a center line plate

10*a*. The plates 14 dividing the air tanks serving as longitudinal strengthening members, and the keel 15 has the form of a channel 15*a* which is rectangular, while the gunwales 16 are tubular in shape with the center tank engaging the upper transverse seat 17. Transverse bulkheads are designated 9 and the limberholes are numbered 9*a*.

The side air tanks form longitudinally extending steps 18 serving as seats, and the center tanks 12 are connected by braces 19 to the side tanks and by combination braces and scupper pipes 19*a* to the keel. In Figures 2 and 3, water gathered at the lowest point is designated 20. Each of the tank compartments may have a water tight handled cover for facilitating the painting etc. A motor could be installed on a platform 12*a* above the keel. In Figure 4 the center line strengthening girder connects the center tank and keel and is designated 21, while a substantially tubular brace 22 connects the sides of the boat. 11*a* in Figure 4 are portable air tanks which may be a plurality of such tanks shaped so as to form longitudinal seats. In Figure 5 the arrangement of the individual seats is diagrammatically indicated and the braces are designated 23 and 24 respectively, while the hook 13 for the attachment of the hoisting cable is shown at the transverse end seats 17.

In Figure 6, showing a boat profile, the tanks 11 and the center tank 12 have a tension rod 25 and combination braces and scupper pipes 19*a* connecting the center tank with the keel 15.

From the foregoing description and by simultaneous reference to the drawing it will be understood that I have constructed a boat having a maximum number of seats for comfortably seating the persons occupying the boat, and combined therewith buoyant air tanks, the plates of the tanks serving simultaneously as strengthening and stiffening members to give the boats sufficient stability and tenacity to support the heaviest load without the danger of sagging or bending during their lowering to the water and making them fit to withstand the roughest seas while the stability of the boat is further enhanced by collecting bilge and sea water at the bottom of the boat in the center thereof.

Further it will be understood that I reinforce a lifeboat by a centerline girder having a straight compression member at the top 12 and a tension member 25 suspended underneath held by braces 19*a* (Fig. 2) to form a curve which is nearest the keel amidship.

It will be understood that I have described and shown the preferred forms of my boat construction as a few examples only of the many possible ways to practically construct the same, and that I may make such changes in its general arrangement and in the construction of the minor details thereof as come within the scope of the appended claims without departure from the spirit of my invention and the principles involved.

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

1. A lifeboat including a hull and gunwales, means extending fore and aft of the boat, located on each side thereof and spaced from each other, cooperating with the boat hull to form buoyancy tanks, a girder extending from stem to stern of the boat and rigidly connected to the stem and stern at its ends at a level adjacent the gunwales thereby forming a longitudinal brace, said girder being constructed to be buoyant whereby said tanks and girder will exert a righting action on the boat when the boat is inverted.

2. The boat as claimed in claim 1, wherein the girder is a hollow member.

3. The boat as claimed in claim 1, including fore and aft brace members between the first said means and the hull of the boat.

WILLIAM E. ELLING.