

Titanic Research & Modeling Association

Murray's Boat Disengaging Gear

By Bob Read

Introduction

The lifeboats of R.M.S. Titanic played a central role in the disaster of April 15, 1912. Many aspects of the lifeboats have been examined. However, not much investigation has been done into the actual construction and equipment contained in the lifeboats. No known plans of the lifeboats exist. The reason may be that plans were not drawn for the lifeboats. The boatbuilding craft was passed down over many years and the procedures were not subject to the rigid requirements of steel shipbuilding. Dimensions, scantlings, and other Board of Trade requirements were probably given to the boatbuilding shop and they applied their experience to the construction without the aid of specific dimensional plans. Certain aspects of boat construction were ancient and others kept pace with the latest industrial technology. One of these aspects was the equipment by which the boat was attached to the falls (blocks and tackle) which lowered the boats to the water. Innovations in this technology were constantly being updated. This gear is known as disengaging gear. Titanic and her sister ship Olympic had a type of device known as Murray's disengaging gear. I have conducted a three year search for specific information pertaining to this device and have decided to codify that information in this document. I will discuss the search for documents relating to this device in the first section. In the second section I will discuss what photo evidence we have. In the final section I will provide drawings to illustrate the possible structure and function of this device.

Documentary Evidence

The most precise description of the boat disengaging gear used aboard Titanic is included in what is known as "Andrews Notebook" which was a notebook of equipment and other information about Titanic's sister, Olympic. Post-disaster testimony indicates that this was the same gear used aboard Titanic. The description in this Andrews Notebook is: "... fitted with Capt. Murray's Improved Lowering Gear..." The captain referenced is Captain Sir Digby Murray. Captain Murray was one of the pioneer captains of the White Star Line. He went on to head the Marine Division of the Board of Trade.

The first avenue of research was to attempt to locate a patent document for this device. This search would be the most frustrating and laborious aspect of this research. I won't describe all

the avenues of research in this area but I will highlight a few. Captain Murray patented a disengaging gear in Britain in 1866. This patent was located but it was clear that it was not the gear used aboard Titanic. No other British or American patents for disengaging gear invented by Captain Murray were ever found. All of the British patents (1887-1912) for this type of device were individually searched in case the device was patented under another name. Unfortunately, none of the patent illustrations matched the known photos of the device. No period journal advertisements have been found for this device. At this point it was thought that all leads had dried up. However, an obscure reference in the British Wreck Commissioners Inquiry into the Titanic disaster referenced a Board of Trade document (Marine Division) in which this device had been approved. A search at the British National Archives indicated that this document had been destroyed. A final avenue of search presented itself recently. A listing of holdings of Harland and Wolff's Technical Services in the late 1990's indicated that they had plans of this device. The Harland and Wolff archive is now held at the Ulster Folk and Transport Museum. Since the archive has been transferred, there has been no access available to the archive and none anticipated in the future. The various post-disaster Titanic inquiries were searched and a few verbal descriptions of the device and its function were found which would assist in trying to reconstruct, with the aid of photos, the best representation possible of this device. In the next section, the known photos will be evaluated.

Photos

The few photos we have of the Murray's gear have had to be mined to discover most of what we know about the actual appearance of the device. The primary photo which has yielded the most information is a photo of Titanic's lifeboats post-disaster tied up at the dock in New York after they had been returned by R.M.S. Carpathia (Figure 1).



Figure 1

In examining enlarged areas of this photo, we find that there are some inconsistencies in the appearance of the devices. The inconsistencies are really apparent between the gear found on the 30 ft. main lifeboats and the 25 ft. emergency cutters. These differences will be discussed later. The next image is probably the best of the device as seen in a 30 ft. lifeboat (Figure 2).



Figure 2

What we see in Figure 2 is a hook which faces toward the end of the boat. There is a hinge on the side of the hook facing toward the center of the boat. Directly below the hinge is a releasing hook presumably which would be pulled downward to release the disengaging hook from its locked position so that it could rotate in a clockwise direction so that the eye at the end of the fall block could slide free. Drawings will be provided in the next section to explain both the structure and the operation.



Figure 3

The next best photo example (Figure 3) is of the forward end of a 25 ft. emergency cutter. In this photo we see the disengaging hook rotated counterclockwise roughly 90 degrees from its locked position.

One of the problems with the images in the master photo (Figure 1) is that there are other items of boat equipment which obstruct a clear view of the gear. The appearance of the gear in the 30 ft. boats appears relatively consistent. Where it can get confusing is with the 25 ft. emergency cutters. The appearance of the gear in these boats even varies from both forward to aft in these boats.



Figure 4

The next photo (Figure 4) is an enlargement of the area of the aft end of a 25 ft. emergency cutter. The fork in which the hook rotates is tilted toward the aft end of the boat and has a rod attached to the lower end of the fork. Some other piece of equipment appears to be obscuring the hook part of the gear. As will be explained later, in Figure 4 we do not see a board which ran fore and aft from the aftmost thwart to the aft end of the boat.

The next photo (Figure 5) shows the gear at the forward end of the 25 ft. boat. You can see the difficulty in discerning the structure of the gear at the angle of its tilt. What can be seen in this photo is that like the gear at the aft end of the boat, the gear appears to be angled toward the end of the boat. But at the forward end in Figure 5 there is a board through which the rod passes.

The next aspect of the photos to be examined is the apparent difference between the gear seen in the 30 ft. main lifeboats as seen Figure 2 and those seen in the 25 ft. emergency lifeboats as seen in Figures 6, 7, and 8. If you compare these gear, what one notices is that the fork which



Figure 5



Figure 6



Figure 7



Figure 8

holds the axle for the hook on the 25 ft. boats has its tines spaced fairly widely apart. For some time it was difficult to reconcile the appearance of these with those seen in Figure 2. Figure 8 began to offer some clues. As we can see in this photo, there is a chain shackle fixed from the fall block through the tines of the gear's fork. What I believe this shows is why the tines of the 25 ft. boat gear needed to be wider. The 25 ft. emergency boats were always suspended in the falls. They did not rest on chocks. With this constant strain on the gear, there needed to be a safety measure to prevent damage to the boat if the gear would accidentally disengage. The way this was accomplished was by a chain shackle where the chain attached to the block and rove through the hook and its axle so that if the hook accidentally disengaged, the weight of the boat would be borne by the chain. The fact that there were two different variations of the Murray's gear was confirmed by a search for documents relating to the gear in the British National Archives. Figure 9 is the Log book which referenced the two designs of the Murray's gear. Design A referred to the gear for the 30 ft. main lifeboats and Design B referred to the

gear for the 25 ft. emergency cutters. As you can see, the entries have been stamped "destroyed" because the documents referencing these two designs had been destroyed. I have added two arrows pointing to the notations of Design A and Design B. This was confirmation that there were two designs of the gear and that the photos were not deceiving.

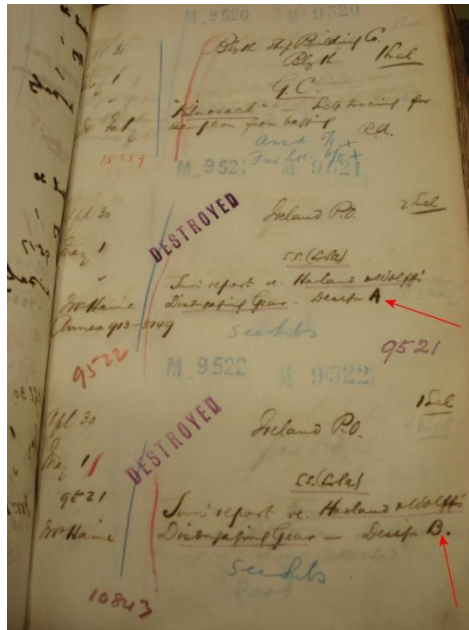


Figure 9

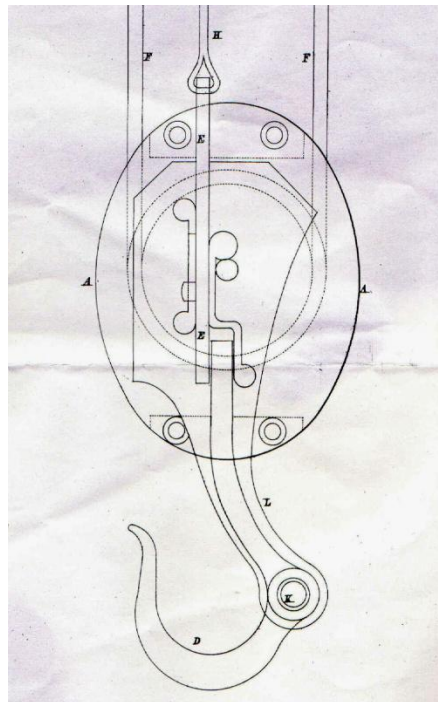


Figure 10

Figure 10 is a scan of Murray's original 1866 patent for boat disengaging gear. The main design difference is that the disengaging gear is an integral part of the lower fall block. This early design does have some elements which influenced the later design. The later design kept the rotating hook except that now the hook rotated on an axle between the tines of a fixed fork attached to the boat.

The next aspect for which we have no actual photos is the release mechanism for the gear. Much of our knowledge of this release gear has come from testimony given in the British Wreck Commissioner's Inquiry. The relevant information from the inquiry indicates a type of release gear which was operated by a lever which was rotated and which was roughly amidships in the boat. The other design feature of the releasing gear is that it releases both gear simultaneously. Here are testimony excerpts describing the releasing gear:

20506. (Mr. Rowlatt) There is a general question raised in this case as to the utility of boats in the case of a ship of this class and size. From that point of view just tell me about the disengaging gear at the bottom that lets the boat escape from the falls after it has been lowered. What is that? I mean describe how it acts, never mind the detail?

- It is a hook which is thrown out by pulling over the lever amidships in the boat. You will remember one of the witnesses could not find the lever and had to cut the falls; but there is a hook hooked into the eye under the block through which the ropes pass and the hook which is thrown out is released – is thrown apart, by this lever.

20513. Then in the middle of the boat is there a lever going across the boat?

-Yes

20517. (Mr. Rowlatt) Then the boat is released and there is no danger of one end being released before the other?

– No; that is the object; both ends are connected up with one lever; when one is thrown over both are.

What has provided the most insight to the structure and function of the releasing gear can be found in the listing of drawings of the different components of the releasing gear. These were previously available from Harland and Wolff's Technical Services. If we look at the titles of some of the individual drawings, we get some clues about the releasing gear.

Drawing titles:

1. Details of Thwart Casting for Murray's Boat Gear "B"

First of all, the designation “Boat Gear ‘B’” refers to the gear for the 25 ft. emergency cutter. I believe that what this drawing portrays is the lever assembly which, when rotated, releases the disengaging gear. This module apparently has a cast housing which attached to one of the thwarts in the middle of the boat. In the drawings section, I have postulated a possible structure for this module and its locations.

2. Details of End Rod for Murray’s Dis-Engaging Gear

I believe this drawing portrays the rod which connected the disengaging gear to its fastening point on the keel. For the 25 ft. emergency cutters I believe the rod was not a simple rod like that for the 30 ft. boats. I believe the connecting rod for the 25 ft. boats was forked at its terminal end near the keel so the releasing chain could travel along the keelson without interference. This will be illustrated in the drawings section.

3. Details of Keel Plate and Sheave for Murray’s Boat Dis-Engaging Gear

I believe this drawing shows the keel plate to which the end rod of the gear connected. The sheave most likely refers to a sheave which would redirect the releasing chain from its horizontal direction of travel along the keelson to the vertical direction where it connected to the releasing rod.

4. Details of Socket for Connecting Chain and Rod for Murray’s Boat Dis-Engaging Gear

To understand what this drawing likely portrays, we must understand the historical meaning of the term “socket”. A socket was basically a tube into which something was inserted or in this case, through which something passed. A more modern term would be a “conduit”. In this case I believe the releasing chain passed through the sheave to redirect it vertically to join with the connecting rod. So to protect the chain and rod, they passed vertically to the disengaging gear through this socket or conduit.

4. Socket to Take Lever Handle for Murray’s Boat Dis-Engaging Gear

What is probably shown in this particular drawing is somewhat confusing. It is possible that it shows how the lever handle connects to the thwart casting for pulling on the releasing chain. What I suspect it may actually refer to is the socket which attaches to the lever handle casting on the thwart and through which the releasing chain travels from the keelson to the lever casting assembly.

With these drawing titles giving us clues about the structure and function of the releasing gear, I will attempt to reconstruct the individual elements in my drawings. If we ever locate these drawings, we will no longer have to speculate about the details of all the gear. But for now, these drawings will have to suffice.

Drawings

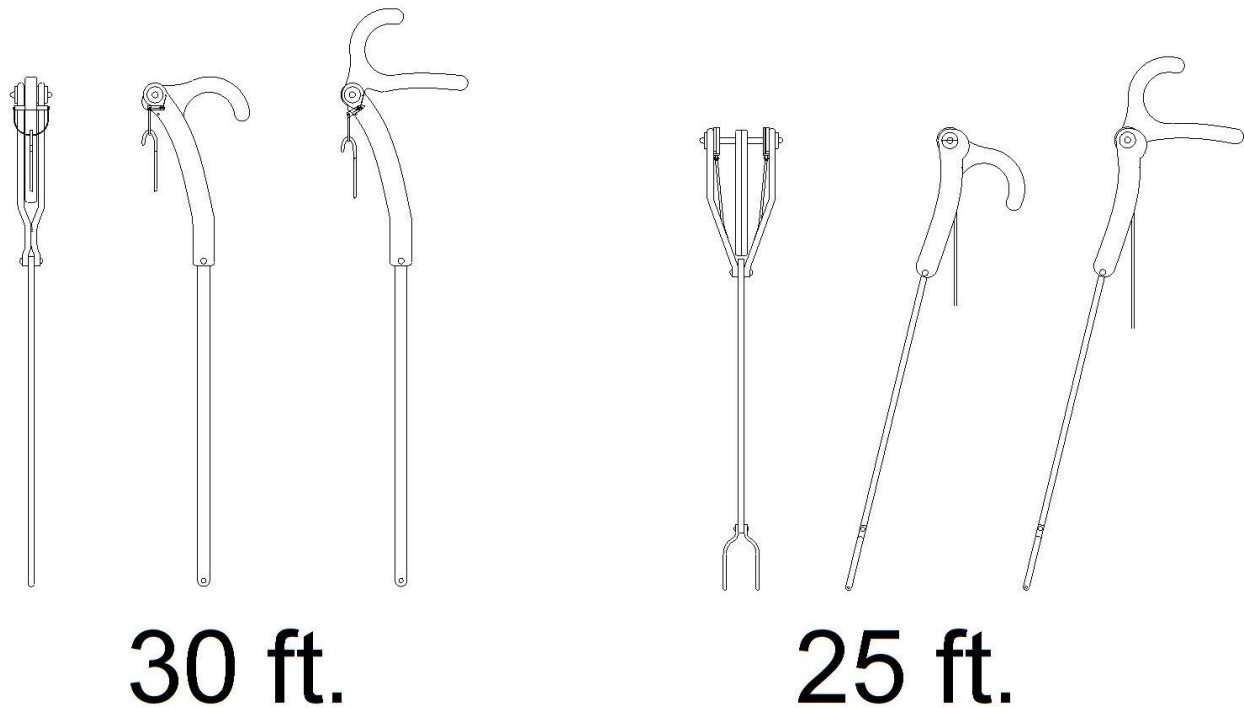


Figure 11

Figure 11 has a number of drawings showing the configuration of the disengaging gear for the 30 ft. and 25 ft. boats. There are both an end view and a lateral view in both drawings. These drawings show the gear in its locked position. The far right drawings show the gear released when the locking mechanism is pulled downward by the releasing hook which is attached to the releasing mechanism.

In Figure 12 we see an illustration of the release of the disengaging gear from the falls. The disengaging gear hook attaches to an eye at the bottom of the lower fall block. When the releasing mechanism's rod pulls down on the releasing hook attached to the latch mechanism, the disengaging hook is unlocked and released. It is able to rotate and release from the eye in the fall block which allows the boat to fall away from the falls and be free to maneuver.

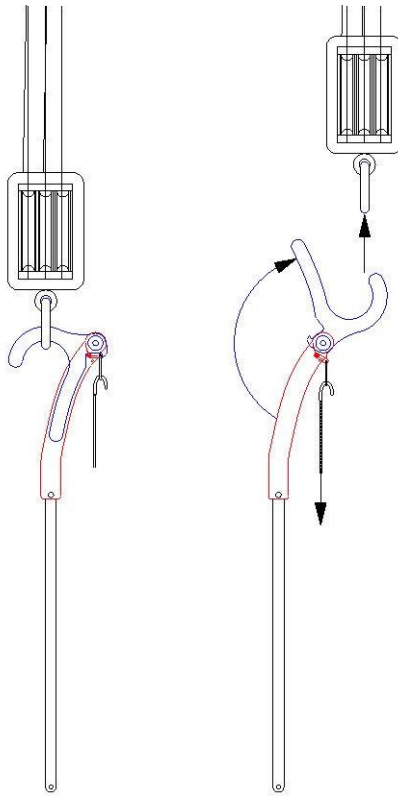


Figure 12

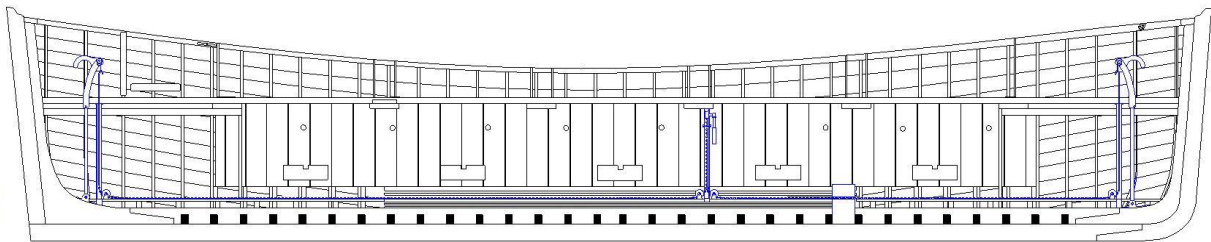


Figure 13

Figure 13 is a longitudinal cross section of a 30 ft. main lifeboat. The positions of the disengaging and releasing gear are shown in blue.

Figures 14, 15, and 16 are enlargements of the pertinent areas of figure 13. Figure 14 is the aft end of the boat. Figure 15 is the forward end of the boat. Figure 16 is the mid area of the boat showing the location of the releasing gear.

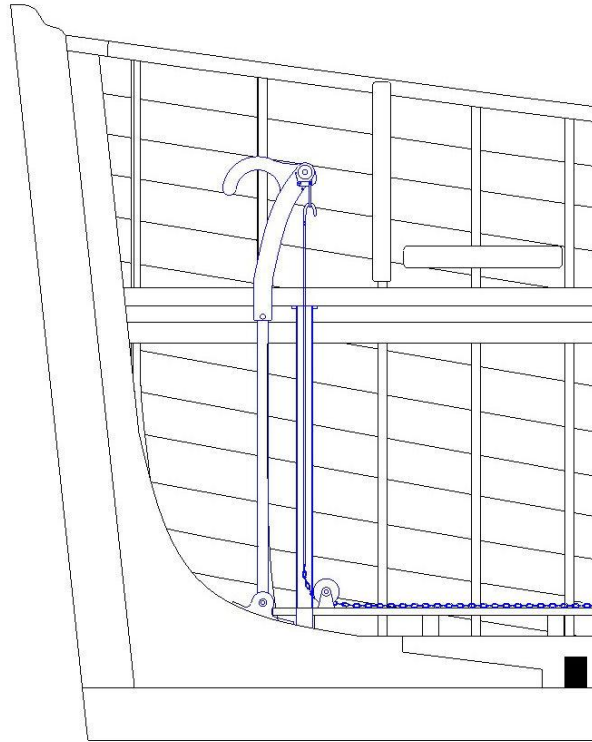


Figure 14

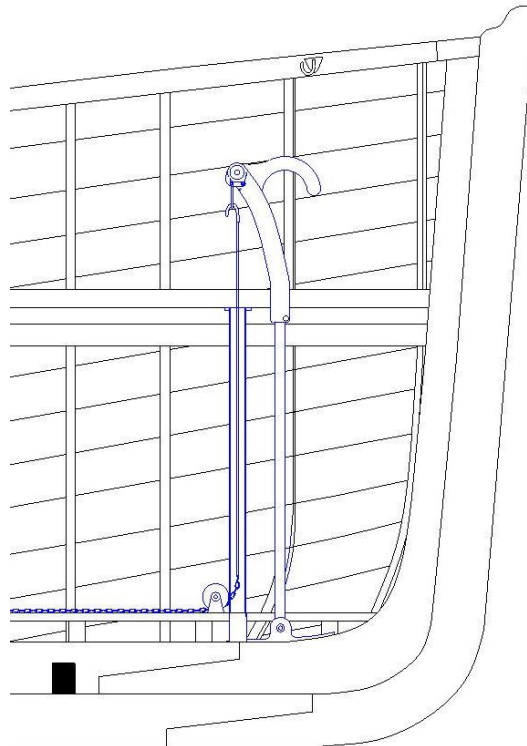


Figure 15

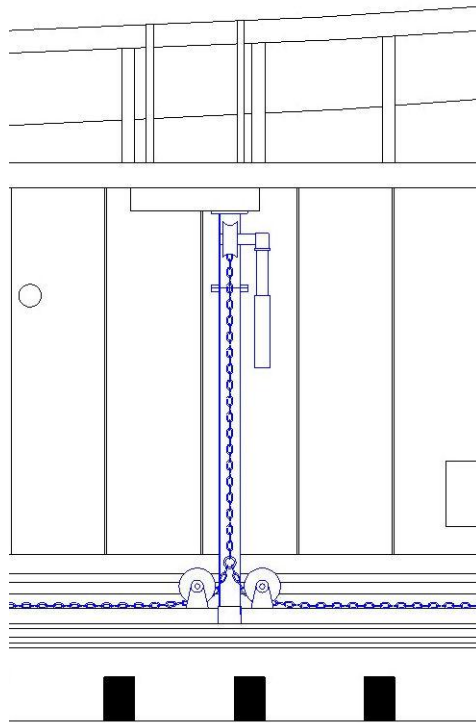


Figure 16

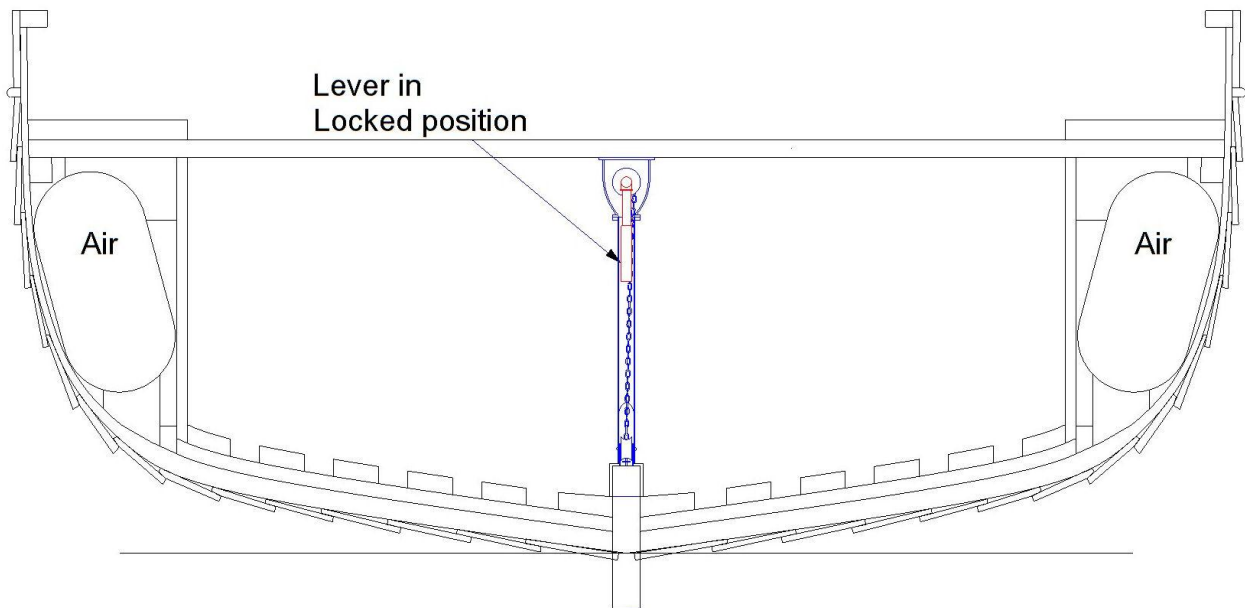


Figure 17

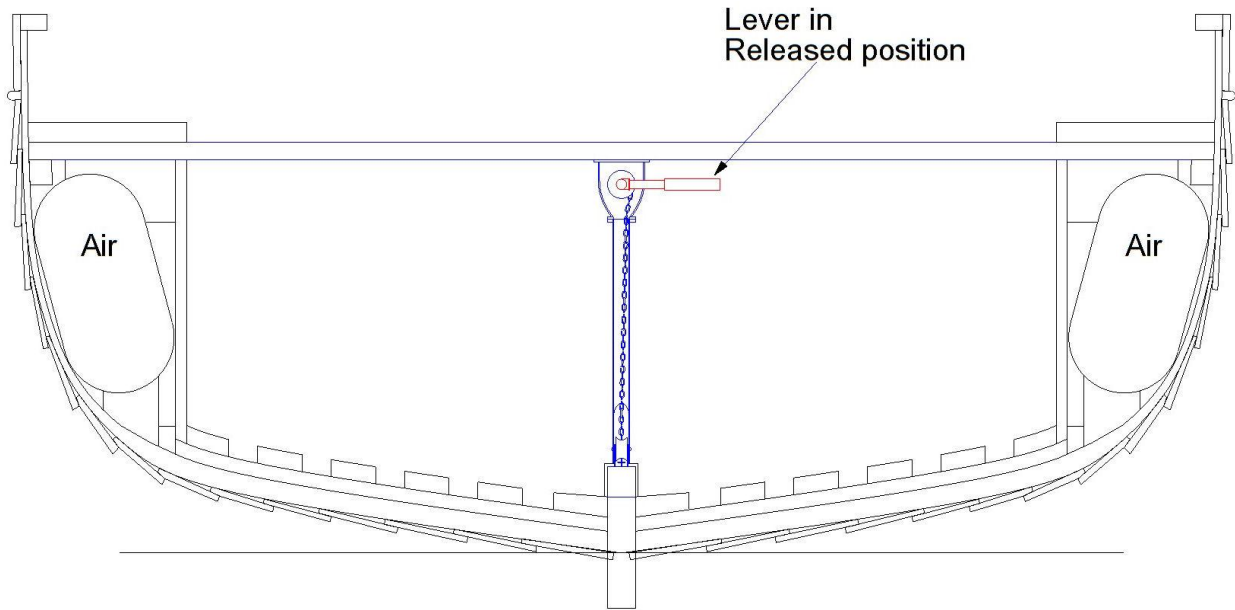


Figure 18

Figures 17 and 18 are cross sections across the breadth of the 30 ft. boat near the releasing lever. The positions for the locked and released positions are indicated. The lever was placed on the forward side of the thwart because those rowing would be facing aft. During rowing operations the lever would be behind the rower and would not interfere with the rowing function.

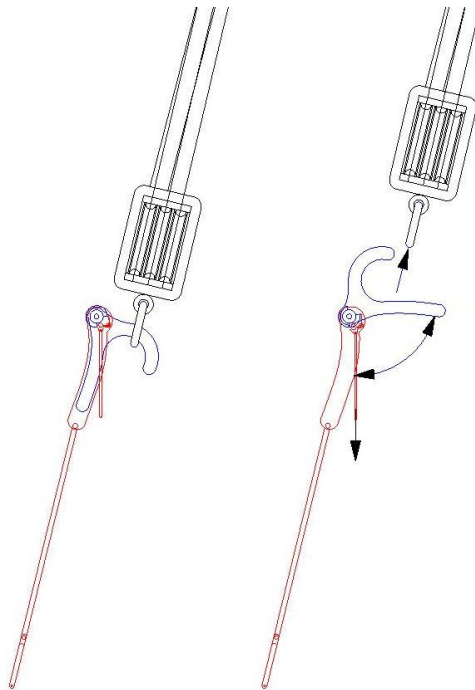


Figure 19

In the next series of drawings, the configuration of the alternate design of “Design B” of the Murrays device for the 25 ft. emergency cutters will be examined. In the Photos section, the existence and reason for a modification of the design of the gear for the 25 ft. boats was discussed. Figure 19 illustrates the operation of the gear for the 25 ft. boats. This gear is angled toward the ends of the boat. Its operation is similar to that of the gear for the 30 ft. boats as shown in figure 12 except that the pull on the gear is not straight upward as with the 30 ft. boats. Rather, the gear has to be angled to accommodate the davits which are spaced to accommodate the 30 ft. boats.

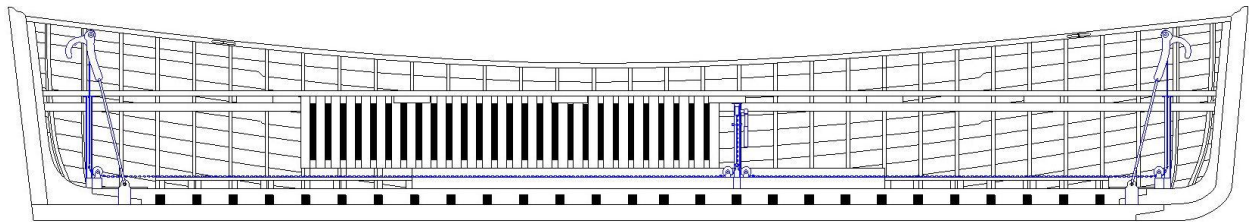


Figure 20

Figure 20 illustrates the gear for the 25 ft. boats in a longitudinal cross section.

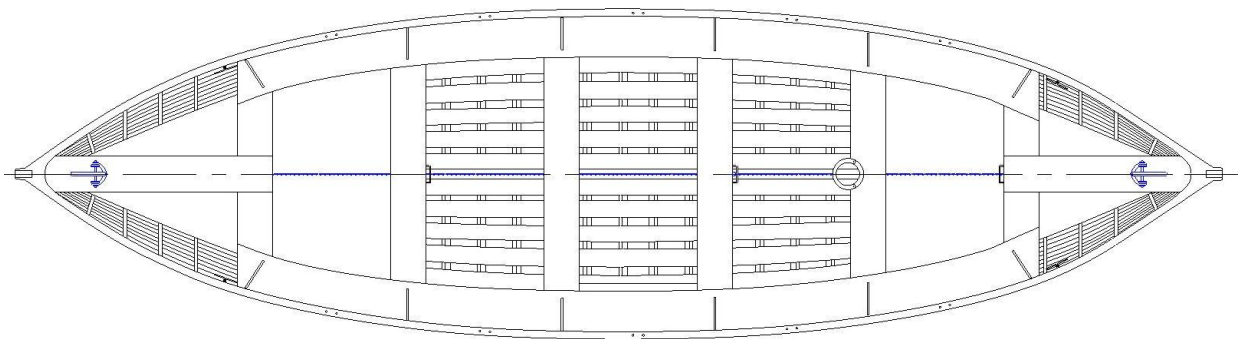


Figure 21

Figure 21 illustrates a plan view of one of the 25 ft. boats.

Figures 22, 23, and 24 are enlargements of the pertinent areas of Figure 20. Figure 22 is the aft end of the boat. Figure 23 is the forward end of the boat. Figure 24 is the mid area of the boat showing the releasing lever.

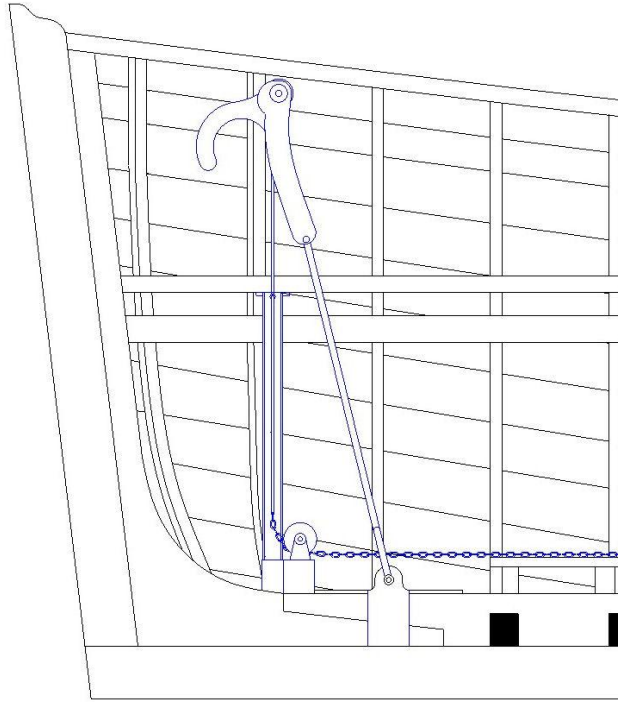


Figure 22

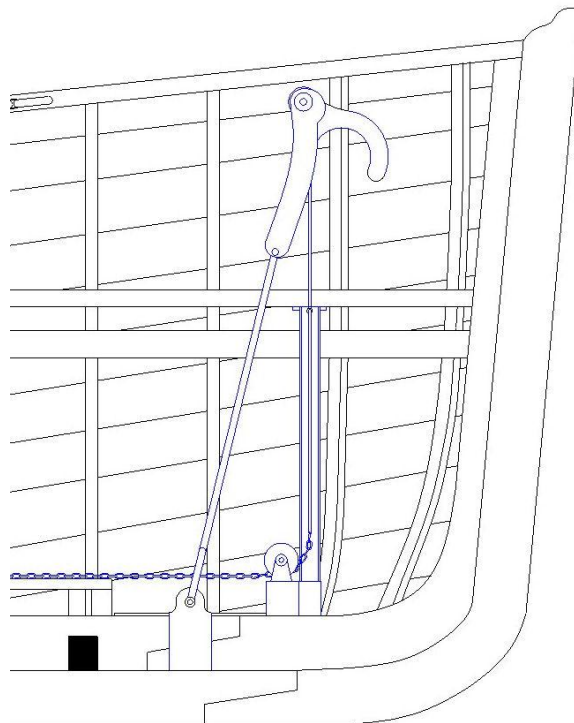


Figure 23

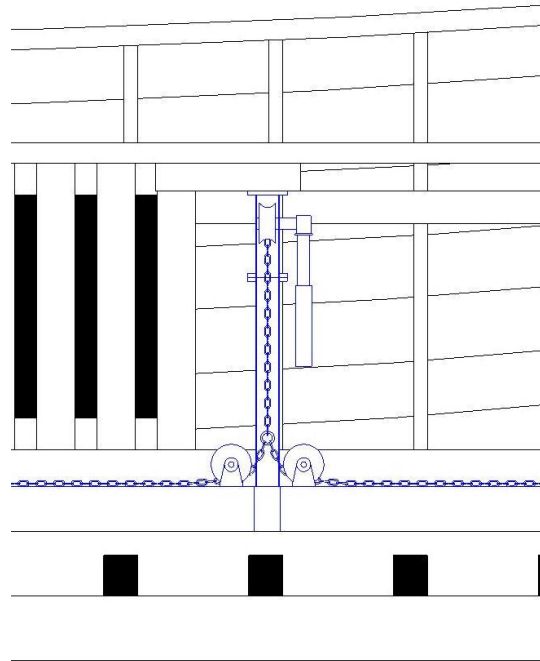


Figure 24



Figure 25



Figure 26

Recently an observation was made which helped explain some of the discrepancies seen in the 25 ft. boat disengaging gear. Figure 25 is an enlargement of the aft area of one of the 25 ft. boats. I have placed an arrow pointing to an area on the aft thwart which is a different color. What this indicates is where a fore and aft board attached to the aft thwart. Figure 26 shows the outline of where this board would have been before the board was torn away. The disengaging gear on the 25 ft. boats was angled to accommodate the spacing between Titanic's davits. Probably when this boat was being hoisted aboard R.M.S. Carpathia, the boat was being hoisted in such a manner that the force on the disengaging gear was vertical rather than at its

designed angle. This tended to lift the fore and aft board away from its fastening. After this board was gone, the disengaging gear now is not held in its designed position but falls toward the aft end of the boat as we see in the photo. This discrepancy hindered accurate interpretation of the set-up of the disengaging gear on the 25 ft. boats for some time.

Conclusion

It is readily acknowledged that there are gaps in our knowledge of the specifics of the Murray's disengaging gear as installed aboard Titanic. The question then becomes whether an effort should be mounted to try to unravel the mysteries of this gear and to speculate about those areas where its structure is unclear. If there were other avenues of research still open which had a reasonable chance of producing results, then I would probably not advance any speculation about the structure and function of the gear. However, in the past three years, every research avenue of which I am aware has been exhausted. The only two possibilities I believe that have any chance of yielding results are if the Harland and Wolff archive at the Ulster Folk and Transport Museum is opened or if anyone comes forward who procured a copy of the plans of the gear while Harland and Wolff still administered their archive. There is no way of estimating the probability of either of those events so I have decided to proceed with this analysis at this time.

While we have photos which provide some strong clues about the structure and function of the Murray's disengaging gear, there are several areas where we don't have any direct information at all. These are:

- A. We don't know the exact structure of the releasing gear. By releasing gear I am referring to the lever amidships which was thrown to activate the disengaging gear.
- B. We don't know the exact structure of the disengaging gear as far as the exact mechanical design of the mechanism of the latch which allows the gear to rotate and disengage.
- C. We don't know the exact design of the attachment of the disengaging connecting rod to the keel.

Even though we don't have the specific information given above, this gear did not exist in a vacuum. By researching hundreds of different patent designs of disengaging gear used during this period, it is possible to make informed speculations which are likely to be close to the actual design.

One aspect of the design of the disengaging gear for which I did not provide detailed drawings or explanations was the actual mechanical means by which the gear was released and the hook was allowed to turn freely and release. There are a number of ways this could easily be

accomplished but our photos aren't good enough to show this kind of detail. I did develop mechanical designs by which the disengagement would happen but my particular design could not be offered as anything more than one particular possibility.

If this research has done nothing else, my hope is that it has at least established where the current frontiers of knowledge regarding the Murray's gear are located. It is also my hope that someone who reads this will have the ability to exploit the remaining avenues of possible research so that at some point we will have clear plans of this gear.

Bibliography

1. Andrews, Thomas: "Andrews Notebook", 1911. This collection of technical information about S.S. Olympic was a Harland and Wolff, Ltd. document not specifically written by Thomas Andrews.

2. British Wreck Commissioners Inquiry: 1912, Day 19, Testimony of Edward Wilding.

3 Classified Abridgments of British Patents: Class: Ships &c, Div. III, 1887-1912.

4. Harland and Wolff, Ltd. Technical Services: Holdings relating to Murray's disengaging gear listed before transfer of the archive to the Ulster Folk and Transport Museum.

- * Details of Thwart Casting for Murray's Boat Gear "B"
- * Arrangement of Murray's Boat Dis-Engaging Gear Arranged for Welin's Davits
- * Details of Dis-Engaging Gear for Lifeboats Type "A" Full Size
- * Detail of End Rod for Murray's Dis-Engaging Gear
- * Detail of Keel Plate and Sheave for Murray's Boat Dis-Engaging Gear
- * Details of Socket for Connecting Chain and Rod of Murray's Boat Dis-Engaging Gear
- * Socket to Take Lever Handle for Murray's Boat Dis-Engaging Gear
- * Hook for Murray's Boat Dis-Engaging Gear
- * Eyebolt and Link for Boat Fall Block to Suit Murray's Dis-Engaging Gear
- * Lifting Hooks for Lifeboats
- * Arrangement for Boat Covers (Tell's Patent)
- * Arrangement of Murray's Boat Dis-Engaging Gear
- * Instantaneous Engaging and Dis-Engaging Boat Gear (Mill's Patent)
- * Arrangement of Dis-Engaging Gear for Lifeboats
- * Details of Dis-Engaging Gear for Lifeboats

5. Murray, Digby: Patent GB1347, Date: 1866

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