An Examination of the Early R.M.S. *Olympic* Fidley Ventilation System Controversy

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Introduction

In the last few years a controversy has arisen regarding early *Olympic's* fidley ventilation system. The controversy itself is not that complicated. On one side there are those who believe that early *Olympic's* fidley ventilation system was not configured like that of Titanic and most other ships. Where the fidley trunks terminated at the base of funnels #1, #2, and #3 on Titanic they were covered with iron gratings. Those who believe *Olympic's* fidley system was different believe that instead of gratings atop the fidley trunks, believe that they were plated over except for a small access hatch to the fidley trunk.

The other side of the debate believes that there were indeed fidley gratings on *Olympic* but they were not easily visible in photos because they had covers placed over the gratings. As a matter of full disclosure, I support the side which believes that there were fidley gratings on early *Olympic.* I will attempt to present the arguments of the side I oppose fairly. If they do not believe I have, then they are free to publish rebuttals. I will, nevertheless, argue my case with all the evidence that I believe is relevant.

A Brief Explanation of the Fidley Ventilation System

The fidley ventilation system was constructed to provide a means of escape of warm air from the stokehold. This was not smoke and combustion gases from the boiler furnaces. Those were conducted upward through boiler uptakes and funnels. The ventilation of the stokehold had two components. Fresh air was forced into the stokehold from stokehold vent intakes at the bases of the first three funnels by large, powerful electric fan ventilators. This fresh air displaced the warm from the stokeholds which rose passively through the fidley trunks where it exited through the gratings at the top of the trunk. Figure 1 illustrates the ventilation of the stokehold by the fan trunks and the fidley trunks. The blue arrows represent the flow of fresh air to the stokehold and the red arrows represent the flow of warm air from the stokehold up through the fidley trunks.

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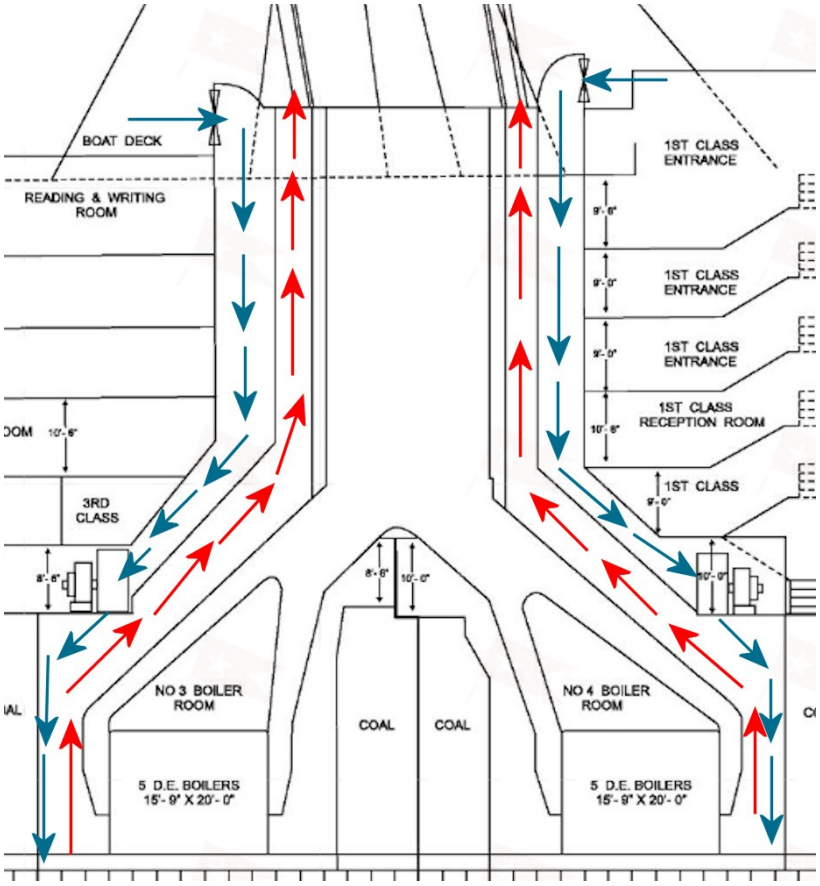

Figure 1

Ventilation of the stokehold on *Titanic*

The Case for No Fidley Gratings on Early *Olympic*

The case for no fidley gratings on early *Olympic* is based primarily on three photos. These photos are shown in Figures #2, #3 and #4.

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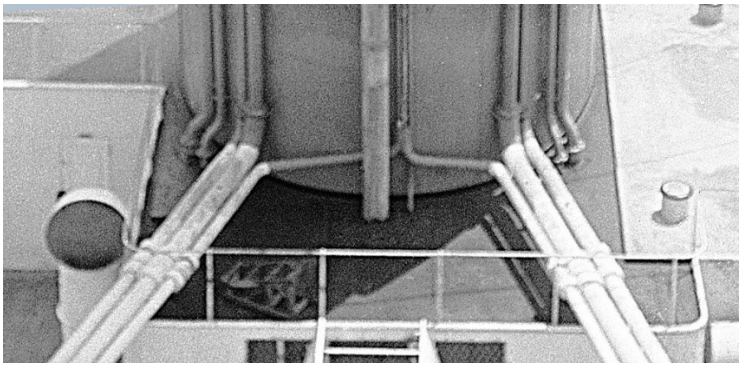

Figure 2

Area aft of early *Olympic's* third funnel

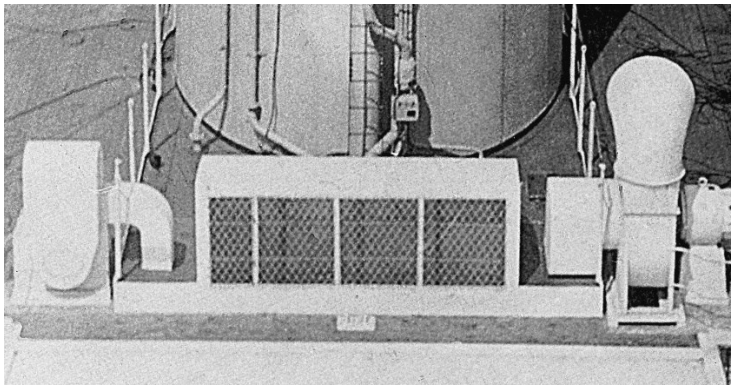

Figure 3

Area forward of early *Olympic's* first funnel

Figure 4

Area aft of early *Olympic's* third funnel

These photos are were all taken very near to *Olympic's* maiden voyage. In each photo we are unable to clearly identify fidley gratings. From this apparent absence of visible fidley gratings, some have made the case that there were indeed no fidley gratings on early *Olympic* and that the fidley openings had been plated over. The only identifiable openings into the fidley trunks are the access hatches on the port side of the forward and aft fidley trunks. There was no hatch on the fidley port and aft of the first funnel because there was a water tank over that area.

This is substantially the case for no fidley gratings on early *Olympic*. The problem with using these photos as the basis for eliminating or greatly modifying early *Olympic's* fidley ventilation system will be enumerated in detail in the case which will be made for the presence of the fidley gratings on early *Olympic.*

The Case for Fidley Gratings on Early *Olympic*

The early *Olympic* photos shown in Figures #2, #3, and #4 are considered an unassailable part of the case against the presence of fidley gratings on early *Olympic.* Is that really true? All three photos will be examined.

In the next three photos shown in Figures #5, #6, and #7, the photo showing the top of the deckhouse aft of funnel #3 is shown.

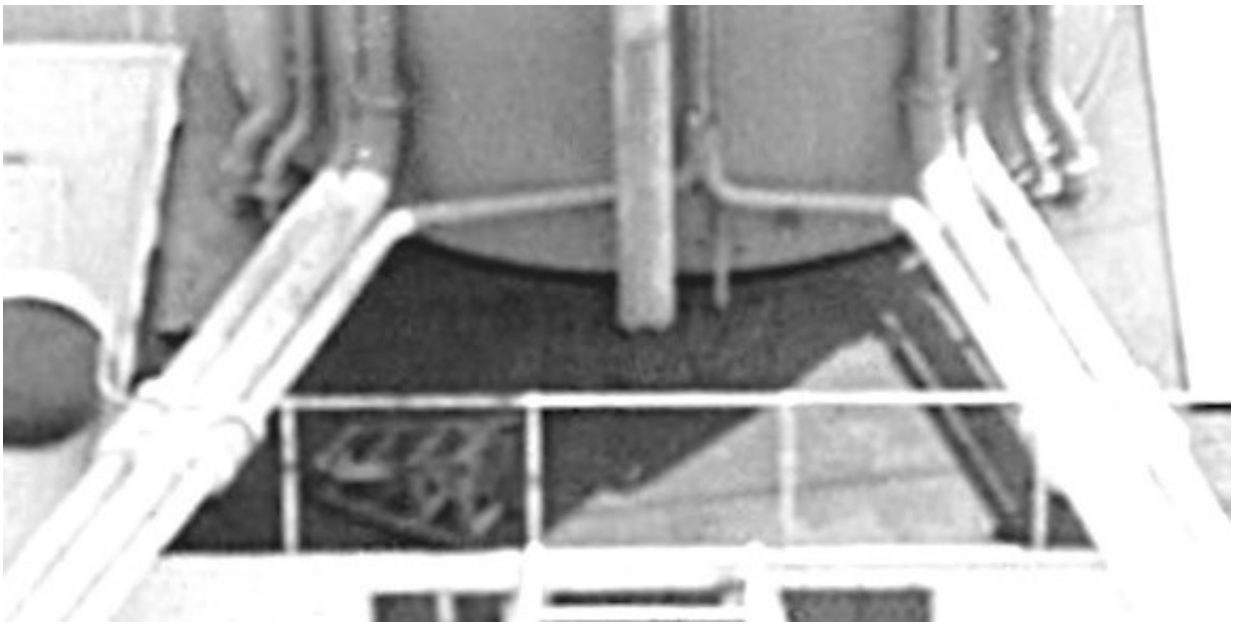

Figure 5

Area aft of funnel #3 on early *Olympic*

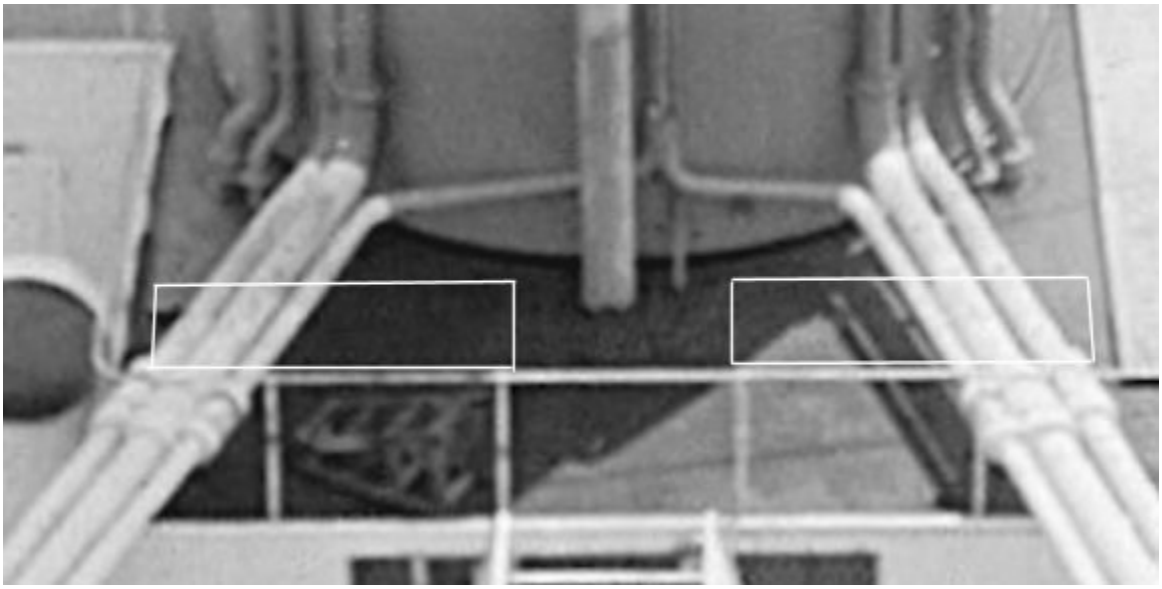

Figure 6

Approximate areas where fidley gratings would be expected

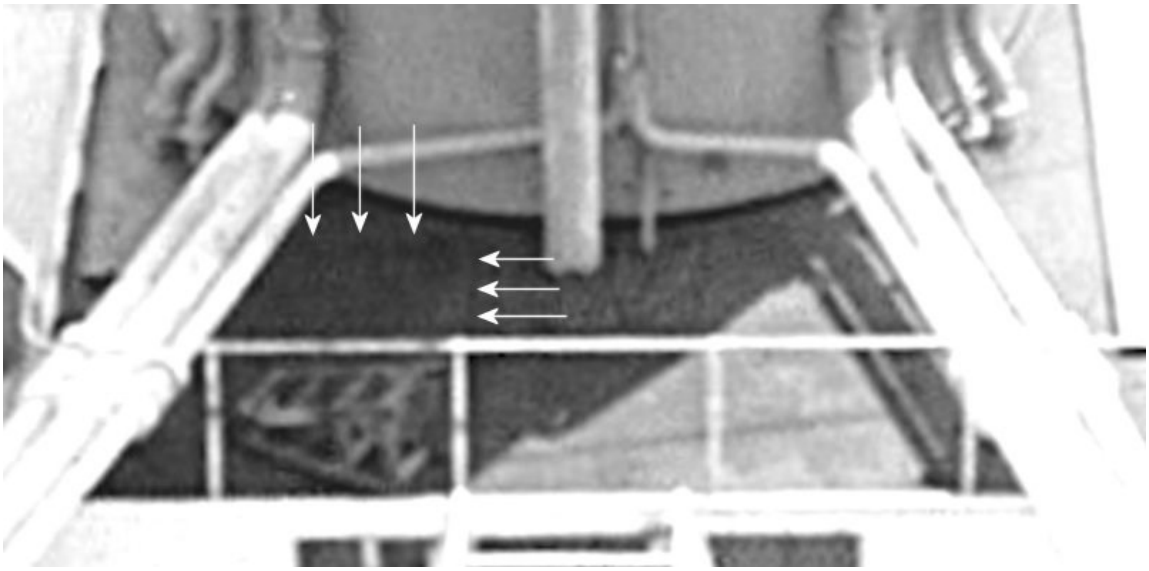

Figure 7

Arrows indicating possible boundary of fidley cover

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If we look at Figure 2 critically, we can see that it is a relatively high contrast photo taken in bright sunlight. The elements of the fidley area are not in sharp focus and are taken from a considerable distance. Figure 5 has had the brightness and contrast modified to see if any details emerge. In Figure 6 the approximate area where we would expect to see the border of the fidley gratings is outlined in white. The case for the presence of fidley gratings on early *Olympic* is based in part on the belief that the in the original three photos there are actually steel covers over the fidley gratings. One may wonder why covers would be used in these photos. All of these photos are taken while Olympic is docked. The covers appear to be used while in port when the boiler rooms were not fully operational. Part of the reason may be because when the boiler rooms were fully operational, rain entering down the fidley shaft would be evaporated by the hot boiler uptakes. If the boilers were not operational, they may have been concerned that rain could collect in the stokeholds.

The question is asked: why can't the seams between the covers and the surrounding plating be seen? This could be because of close fitting covers and less than ideal focus of the area in question. In Figure 7 arrows have been drawn around where we would expect a cover and the surrounding plating would be. The border area appears to at least plausibly show a different shade between a proposed cover and the surrounding plating.

Figures #8, #9, and #10 show the area forward of the first funnel.

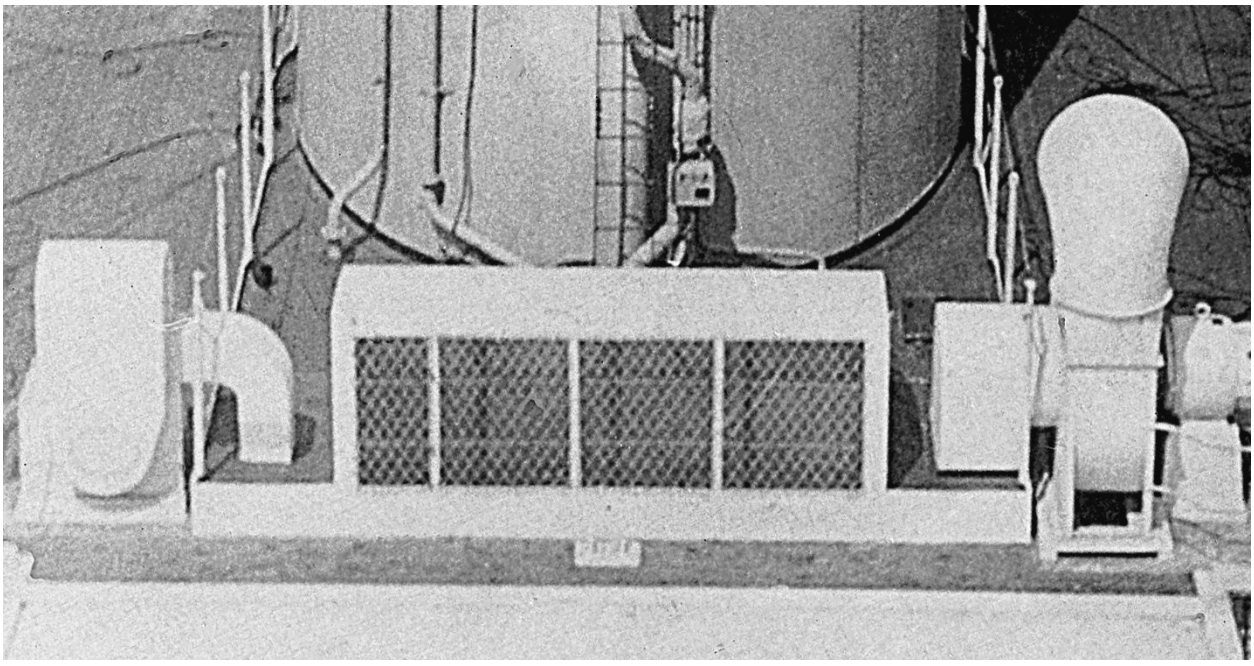

Figure 8

Area forward of the first funnel

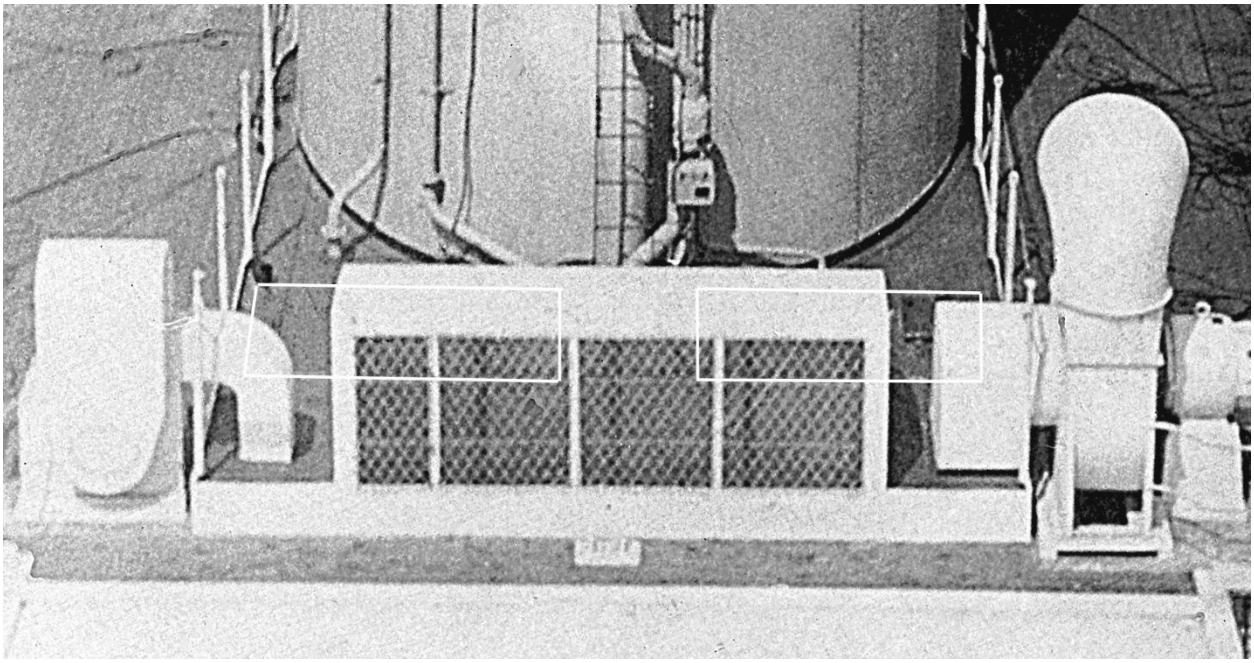

Figure 9

Approximate areas where fidley gratings would be expected

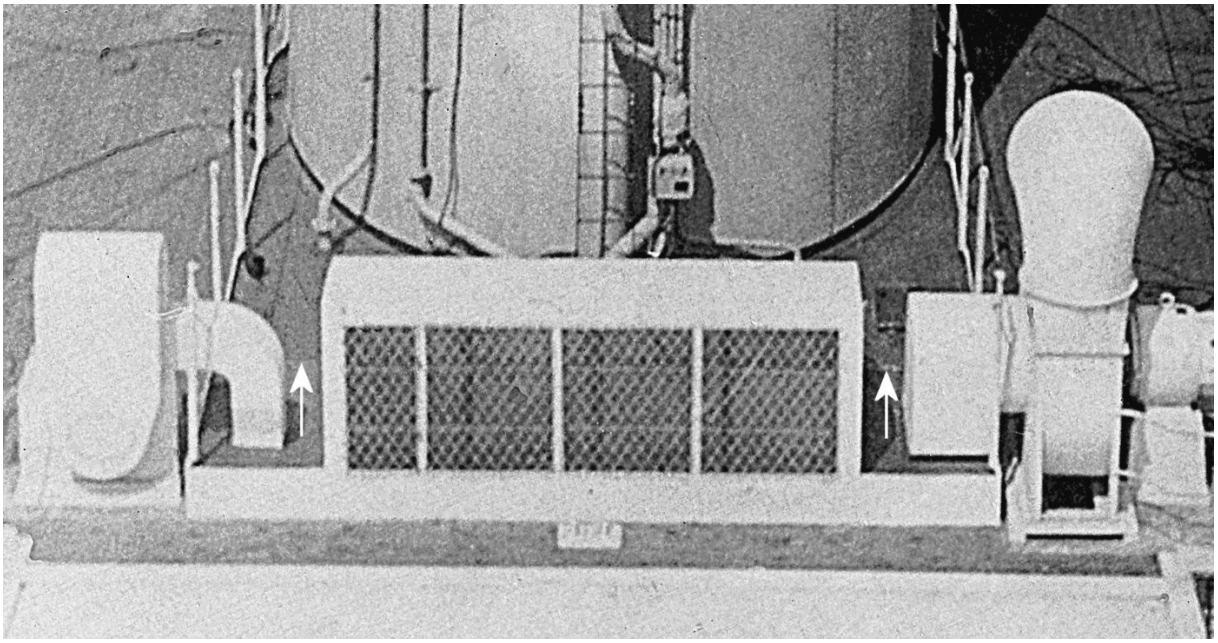

Figure 10

Arrows indicating possible boundary of fidley cover

In figure 8 we see the area forward of the first funnel. The same technique is used as with the photo of the area aft of the third funnel. The brightness and contrast have been adjusted. In Figure 9 we see the approximate areas outlined in white where we would expect to see the boundaries of the fidley covers over the gratings. Figure 10 has arrows pointing to the difference in shading at a couple of boundary areas.

Figure 11 shows the original unaltered photo shown in Figure 3 of the aft area of the third funnel.

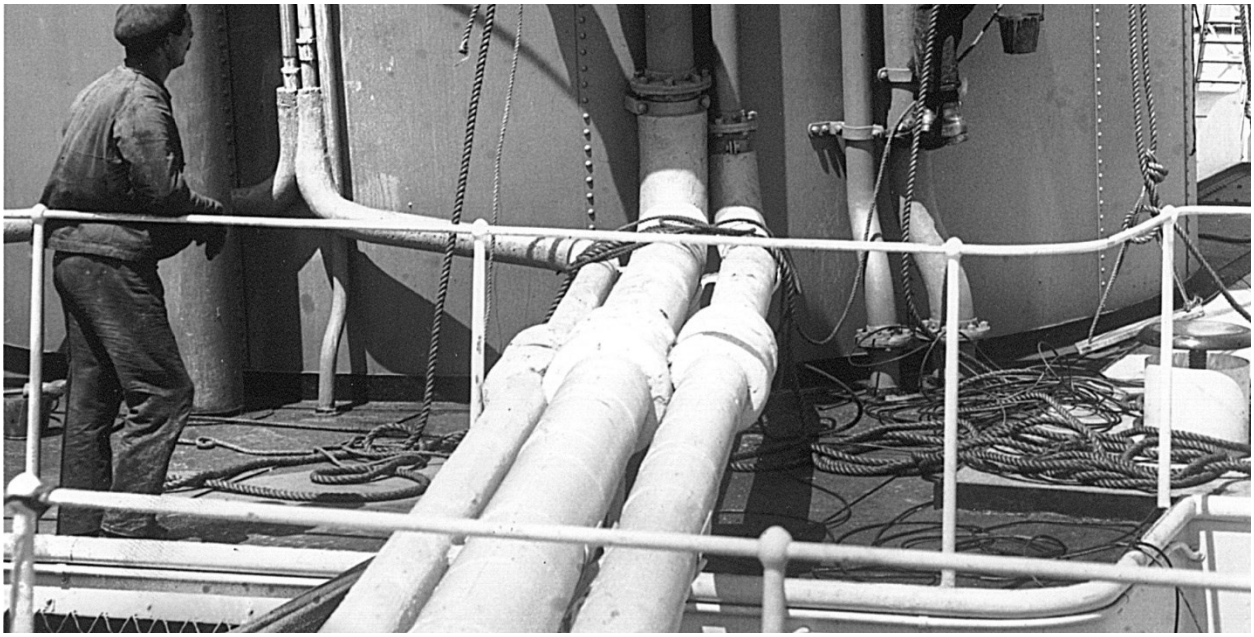

Figure 11

Area aft of the third funnel

The problem with this photo isn't one of focus. The problem is that there are so many ropes on the roof that it is nearly impossible to identify any boundaries between a fidley cover and the surrounding plating. Additionally, the photo is taken from an angle that makes it difficult to see. While this photo might be used to demonstrate that there are no visible fidley gratings, it can't be used to either rule in or out covers over fidley gratings. This photo should argue against the notion that they plated over the fidley trunks to eliminate trip hazards.

More time was spent looking at these photos because they are the basis of the claim for the absences of fidley gratings on early *Olympic*. If we had no other information about the operation of a fidley system, the photos might suffice. However, in the following sections a circumstantial case will be built which will hopefully cause others to abandon their reliance on photos as the sole evidence in this case. High quality photos can be sufficient but, in this case, I believe the circumstantial evidence will prove that the photos are insufficient to eliminate the presence of a standard fidley ventilation system as we see on *Titanic*.

Covers

The subject of covers over fidley gratings has previously been raised in this article. To prove that it was a standard practice at the time to use covers over fidley gratings, we have this quote from *Practical Shipbuilding* by A. Campbell Holms: "The fiddley openings themselves are covered with gratings. In heavy weather, when seas break over the ship, it may be necessary to cover the gratings, for although this may result in an uncomfortably hot stokehold, sufficient air for the furnaces may still be supplied through the large cowl ventilators. For this purpose, hinged sheet iron storm covers are provided."[1]

Thus, it is clear that covers over the fidley gratings were in common use at the time of the maiden voyage of *Olympic.* It is not entirely clear why they were used in port. As was previously suggested, it may have been to keep rainwater from collecting in the stokehold when the boilers were not fully functioning when their uptakes could evaporate rainwater.

Why Don't We See Covers Over Fidley Gratings in Later *Olympic?*

It has been noted in that covers over fidley gratings were not seen in photos of *Olympic* from her 1913 until 1923. The reason the covers were re-installed in 1923 was not so they could serve their original function. They were installed so that the stokehold could be sealed off if it was necessary to fight a fire with steam.[2]

Fidley grating covers were primarily used in vessels which were considerably smaller than the *Olympic* class. In very heavy weather there could be boarding seas which could pour sizeable quantities of water down open fidley trunks. On early *Olympic* they had no experience with how a vessel of this size would perform in heavy weather. Consequently, they took all precautions and provided covers for the fidley gratings. Subsequently, it was likely found that because of the great height of the fidley gratings above the waterline that they never experienced boarding seas to that level even in the heaviest of weather. Also, it was likely found that mere rainwater proved to be no problem since it likely evaporated upon contact with the hot boiler uptakes. I speculate that fidley grating covers were never present on *Titanic. Olympic* encountered a very heavy storm in January 1912 and that experience was likely the basis for dispensing with fidley grating covers on both *Olympic* and *Titanic.*

Why Don't We See the Outline of Fidley Grating Covers in the Early *Olympic Photos?*

Earlier in this article the quality of the early *Olympic* photos was evaluated to try to explain why the fidley grating covers can't be seen clearly. It is likely, but not certain, that the fidley gratings on early *Olympic* were like *Titanic's* in that they stood proud of the surrounding plating by

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[1] *Practical Shipbuilding, A. Campbell Holms, Art. 308, 1917*

[2] Board of Trade Marine Department, M 13129/22, 4/7/1923

perhaps an inch. Is that enough to cause shadowing around the fidley grating? Let us look at a 1913 post-refit photo of the area aft of *Olympic's* third funnel which was taken from the same vantage point as the early Olympic photo evaluated earlier in this article. This photo is shown in Figure 12.

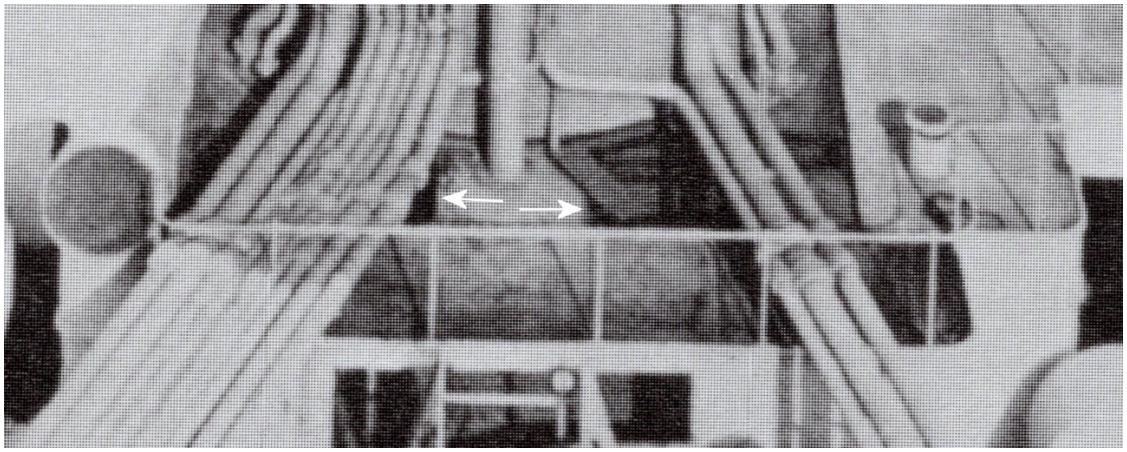

Figure 12

1913 post-refit photo of the aft of *Olympic's* third funnel

Measurements of plans show that this photo like the one of early *Olympic* was taken from a distance of approximately 103 ft. The arrows in the photo show the inboard ends of the fidley gratings. With the fidley gratings standing above the surrounding plating by only an inch, it is impossible to tell that they stand above the surrounding plating. One can see from the shadows being cast that one might expect to see some shadowing of the inboard edge of the starboard fidley grating but we don't. This is not to say that the gratings were flush with the surrounding plating. Rather, it shows the limitations of photos taken from such a distance.

Why Plate Over the Fidley Trunks?

The question of why Harland and Wolff would permanently plate over the upper openings of the fidley trunks is one for which its proponents seem to have no answer. If it was just to provide a flat walking surface for workers who had occasion to work on the rooftops then it seems unlikely. With the ample supply of labor, worker comfort and safety were not primary concerns as they might be today. Certainly, it would not be a sufficient reason to redesign a tried-and-true ventilation system.

Arguments Against the Proposed Function of the Altered Fidley Ventilation System

One of the first and most obvious arguments against the proposed function of the altered fidley ventilation system is that it was construction like any conventional fidley ventilation system. Figure 13 shows the area around what will be the first funnel on *Olympic.* This photo was taken

during fitting-out. We can see the plating divisions around the fidley trunk which extends to the top of the casing. The boundary of the fidley trunk is outlined in white.

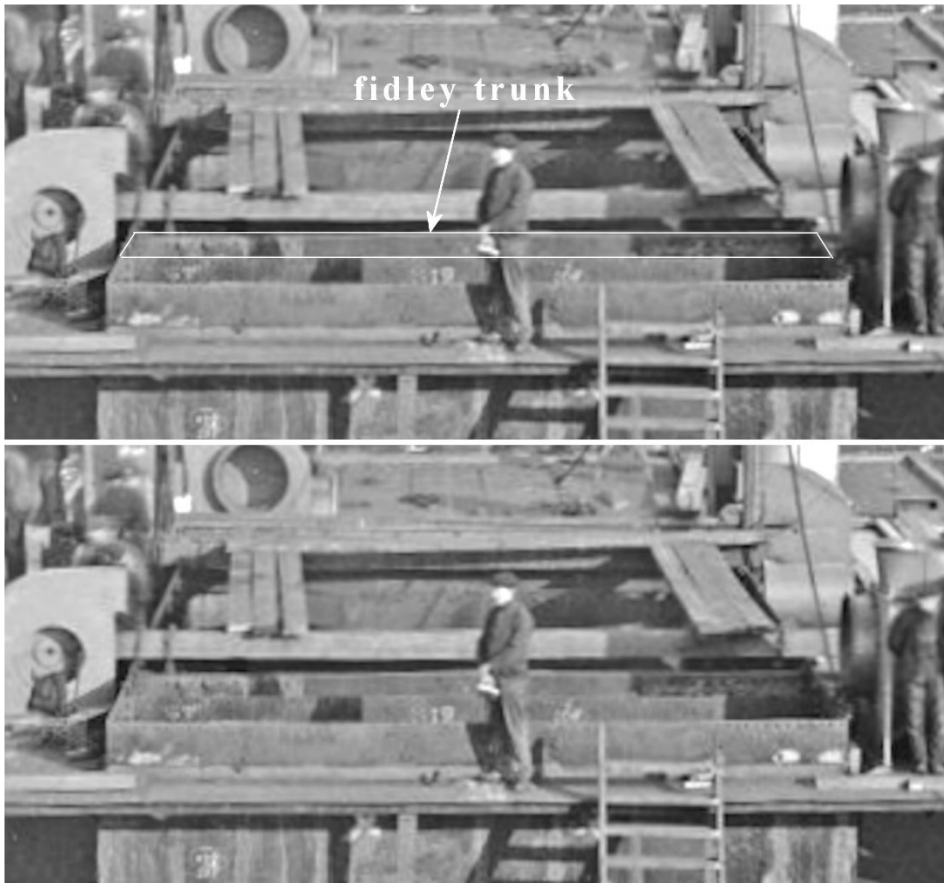

Figure 13

Olympic's fidley trunk forward of first funnel shown during fitting-out

One of the weakest arguments of those who propose the elimination of fidley gratings on early *Olympic* is their inability to propose a viable alternative. First, let's look at *Olympic's* fidley ventilation system specifically. Figure 14 shows a part of an early Olympic plan showing a fidley ventilation system that appears the same as Titanic and Britannic.

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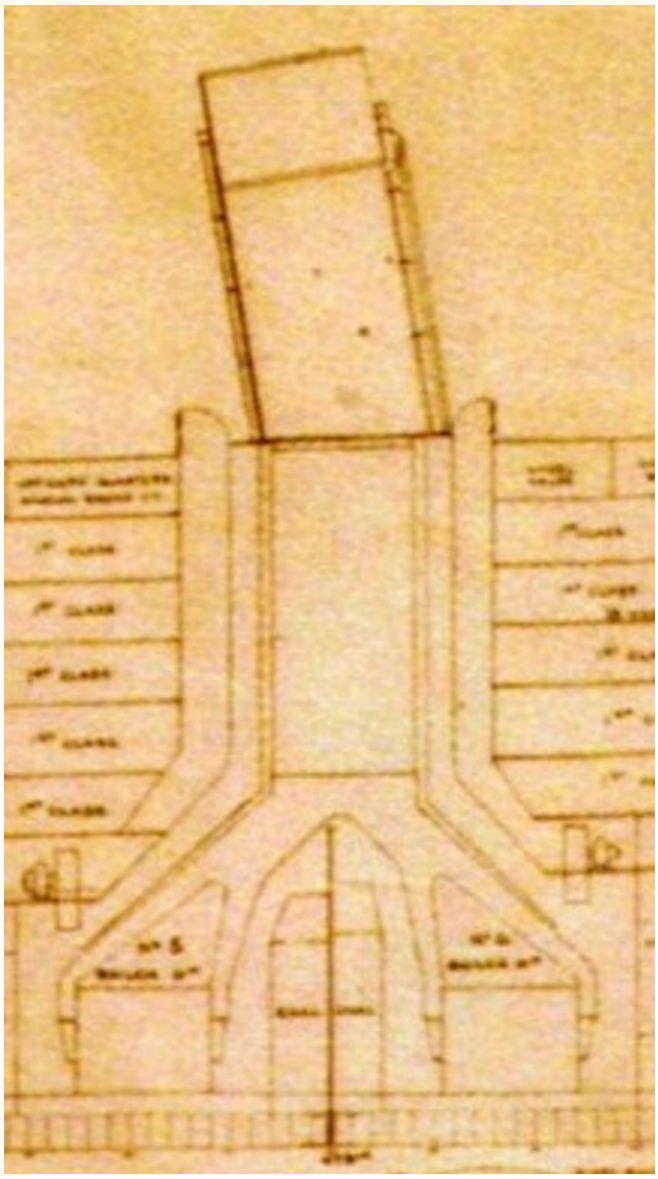

Figure 14

Plan of early *Olympic* showing conventional fidley ventilation system

Figure 15 is a more detailed drawing of *Olympic's* stokehold ventilation system with conventional fidley trunks.

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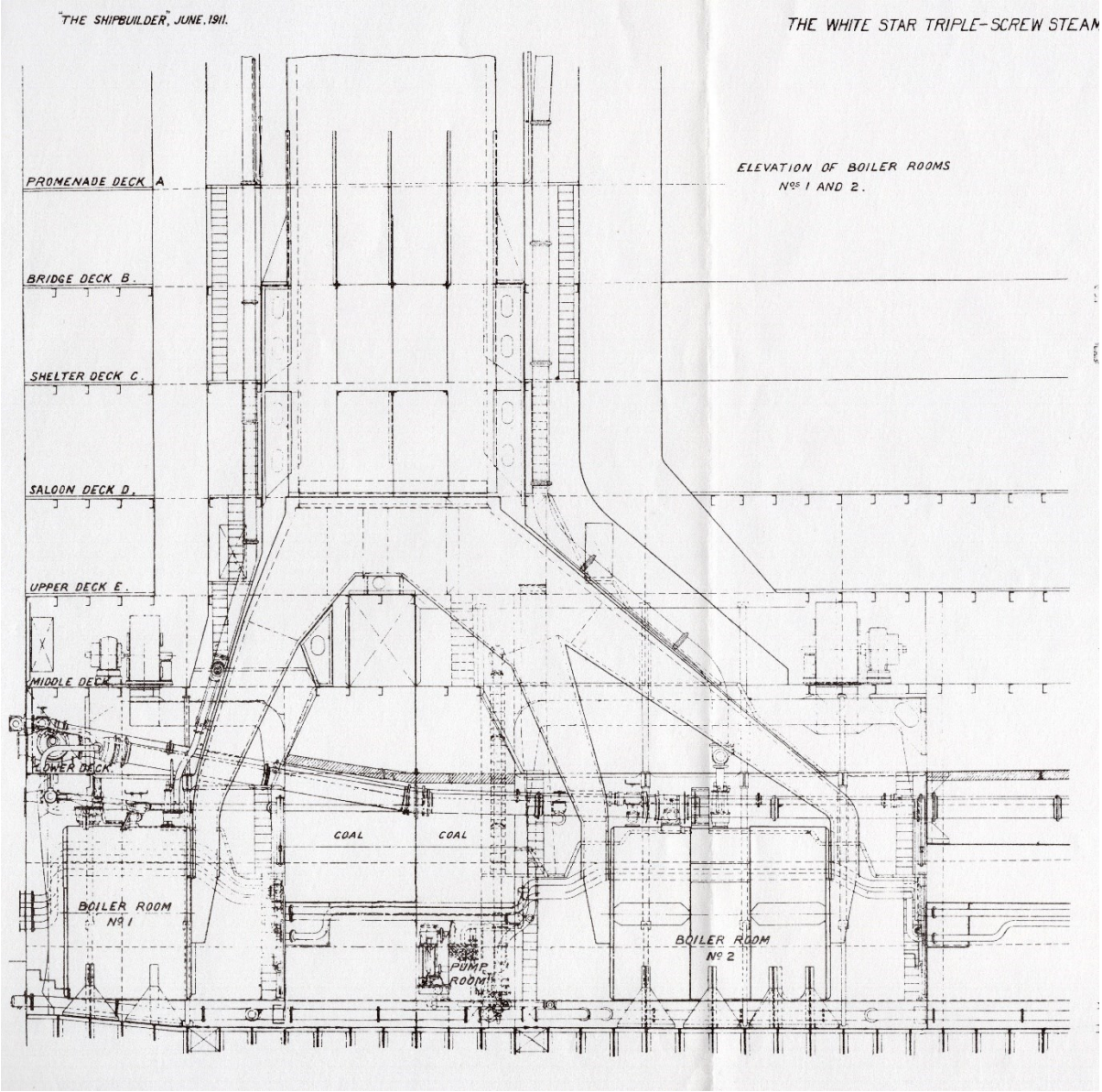

Figure 15

Detailed drawing of *Olympic's* stokehold ventilation system with conventional fidley system

The proponents of an altered fidley ventilation system have proposed two alternatives.

1. All warm air rising through a fidley trunk would exhaust through a single approximately 4 square ft. access hatch (26 in. x 26 in. approximate dimensions of hatch). It is proposed that this was just a bad idea that was subsequently changed to normal fidley gratings over open tops of the fidley trunks. This proposal does a real disservice to the level of

knowledge and expertise of professional marine engineers at the time. In a ventilation system for the stokehold, they were able to determine through mathematical calculations how much air needed to be supplied to the stokehold to support combustion in the boilers furnaces. They also knew that the air volume in the stokehold needed to be changed 15 to 20 times per hour.[3] To do this they not only had to calculate how to supply a sufficient volume of air through the use of powerful electric fans, they also had to be able to calculate the capacity of the fidley trunks to exhaust a similar amount of air efficiently. Additionally, the inflow and outflow of air had to be balanced. If air couldn't escape efficiently through the fidley system there would be an increase of air pressure in the stokehold. This would create a condition of forced draft for the furnaces in the boilers. These furnaces and boilers were designed to operate with natural draft. Therefore, the exhaust of the stokehold air needed to be balanced with the inflow from the stokehold fans. If in extreme weather conditions the fidley grates had to be covered, the speed of the stokehold fans would have to be reduced.

2. The second proposal is that the airflow from the fidley trunks was somehow diverted into the space between the funnel uptake and the boiler casing then to the space between the funnel uptake and the outer funnel skin. The problem with this theory is that it can't be supported by any plans or other documentation.

Harland and Wolff built ships by careful incremental change and evolutionary design. They did not indulge in revolutionary designs. Major innovations were tested usually on other vessels prior to incorporation into a new vessel being designed. Radical changes to the fidley ventilation system as have been suggested would have left some kind of documentary evidence either on plans or in documents. We have no such evidence.

Water Tanks

Another aspect of early *Olympic* that argues against there being no fidley gratings over the tops of the fidley trunks is the presence of two water tanks over the top of the fidley trunk aft of the first funnel on early *Olympic.* Figure 16 shows an original Harland and Wolff plan view of the top of the fidley trunk aft of the first funnel.

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[3] Ventilating and Heating from the Marine Point of View, Charles F. Gross, Page's Engineering Weekly, p.225, 4/19/1919

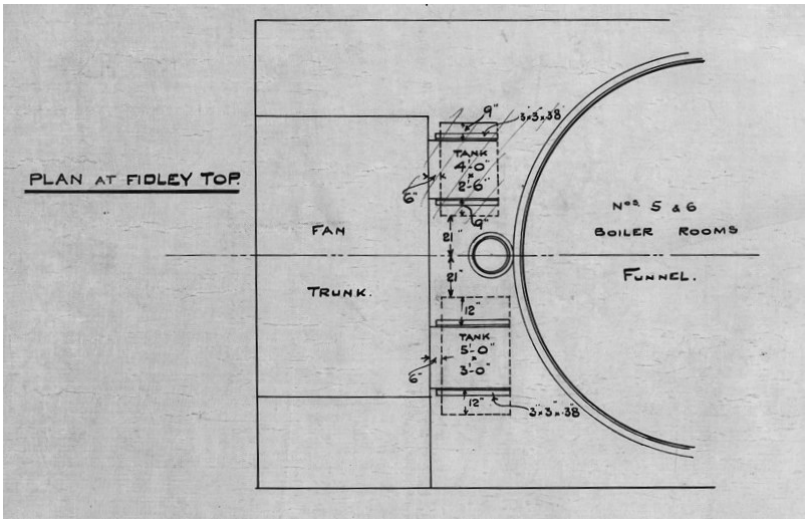

Figure 16

Water tanks over the fidley trunk aft of early *Olympic's* first funnel

It could be argued that they didn't draw the fidley gratings in the drawing. However, if there were just plating, why even mention the location as the top of the fidley? The larger question is why would they located these tanks here when they are exposed to the elements and the larger tank is a freshwater tank which would be prone to freezing? I believe the answer is because the warm air ascending out of the fidley top would keep the tanks from freezing. We see an identical starboard fresh water tank on the *Titanic* wreck in Figure 17 which is sitting atop a fidley grating in the same location as *Olympic's* tank. Sitting atop a plated-over fidley trunk would provide no protection from freezing.

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Figure 17

Freshwater tank sitting atop fidley grating on *Titanic* wreck

Analysis

This examination of alternatives for the configuration of early *Olympic's* fidley ventilation system is not so much an argument about competing evidence as it is about how one evaluates evidence with Occam's Razor in mind. A simplified explanation of Occam's Razor is that if one has to decide between two explanations, the simpler one which explains the facts is usually the correct one. In this situation, in order to justify a configuration where there are no apparent fidley gratings, one must invent a novel fidley ventilation system which has no evidence to support it. For the explanation that there were actually fidley gratings which were covered, one has to accept the possibility that the existing photos are inadequate to clearly show fidley covers over fidley gratings. All the other evidence supports their existence. We know that Harland and Wolff didn't look for complex solutions to simple problems. They also didn't create solutions to problems that didn't even exist. We still have no idea what problem would prompt the disabling of a tried-and-true fidley ventilation system. When one adds to that the non-existence of a documented alternative then I believe we can safely reject such a theory regardless of what its proponents think photos prove.

Conclusion

This article has sought to explain the current controversy about the presence or absence of a conventional fidley ventilation system complete with gratings at the tops of the fidley trunks. Both sides of the argument have been presented as fairly as I am able. I have tried to anticipate objections which have been previously voiced. At this point is up to the reader to decide which side of the controversy has the greater weight of evidence. So that there is no ambiguity**, I**

believe that early *Olympic* had a conventional fidley ventilation system like *Titanic* and *Britannic* with openings at the tops of the fidley trunks covered by gratings.