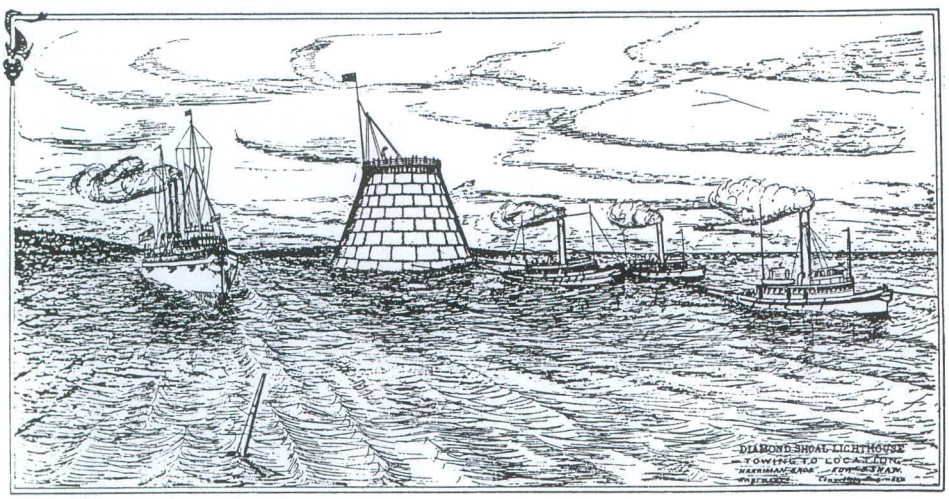
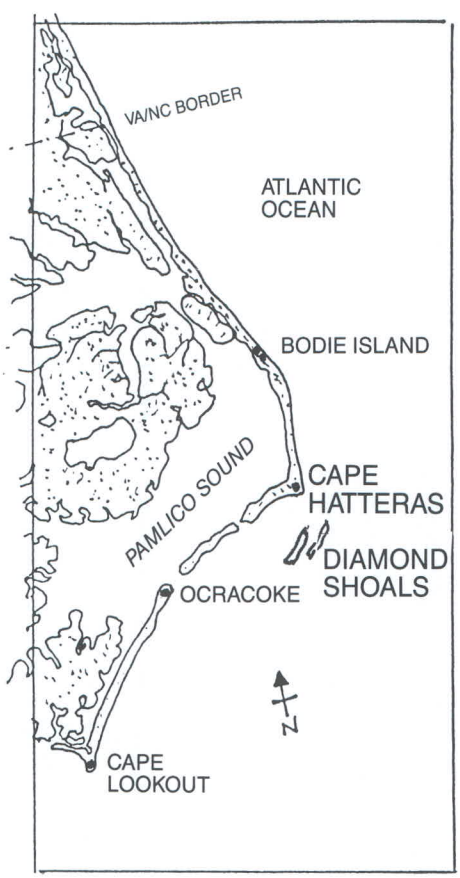
Diamond Shoals Lighthouse

the light-house that never was



by Wayne C. Wheeler

Cape Hatteras, North Carolina, is the elbow of an arm of low islands known as the "Outer Banks". This elbow pokes these barrier islands a good 25 miles into the Atlantic. Seven miles farther at sea are treacherous shifting underwater sand banks known as Diamond Shoals. In the days of sail the Diamond Shoals were one of the most feared spots of any ocean. The strong and wide Gulf Stream moving north at up to 4 knots from the Gulf of Mexico forced the south bound sailing ships to "go inside" or west of the stream to escape the current. Thus mariners had only a narrow band of water between the Gulf Stream and the Diamond Shoals in which to operate. Navigating this stretch of water at night during a Winter storm under sail without the use of modern electronic instruments was indeed a very dangerous undertaking. It is precisely here that the warm moist air from the south mixes with colder currents from the north producing gales with winds screaming to 100 miles an hour. The Gulf Stream sweeps around this projection of land and races and twists in numerous directions. Where the 'stream' coverges with the shallow bottom the sea is almost in a constant boil. Once a ship strikes the shoal it is sucked down with amazing rapidity. In the period between 1875 and 1902 ninety-seven vessels came to grief on the Diamond Shoals with a resulting loss of hundreds of lives.



In the 1888 Annual Report of the Lighthouse Board a plea was made to establish a lighthouse on Diamond Shoals, "Special attention is requested to the facts stated in the appendix to this report relative to the necessity for a light on the other one of the shoals off Cape Hatteras. These shoals have well earned the title of the cemetery of American coasters. Old sailors dread less to go around Cape Horn in the winter than to go around Cape Hatteras in that season.

The Committee on Commerce reported to the Senate that it was satisfied "that a light-house should be erected at once on this spot, the most hazardous to shipping of any on the Atlantic coast. The demands of commerce made through the boards of trade and chambers of commerce of most of the Atlantic and Gulf cities, so impressed the Senate that a bill passed that body making the necessary appropriation for its erection without a dissenting vote, but the bill failed the house. The Board considers the project of building this light as the most important that it presents this season and commends it as such to Congressional consideration." The Lighthouse Board asked for $500,000 to construct the lighthouse, an enormous amount in 1888.

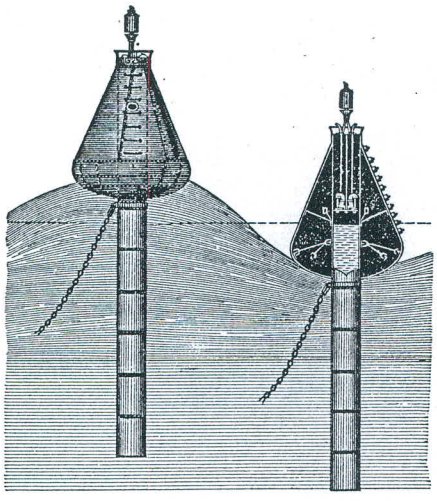
To assist mariners navigate off the Carolinas several lighthouses were constructed along the Outer Banks. That

elbow of Cape Hatteras was rightly the site of the first, in 1798, along with the first Ocracoke lighthouse. Cape Lookout followed in 1812, Federal Point 1816 and Bald Head in 1818. Still others were added later in the century. But, even with this string of beacons along the Outer Banks, mariners continued to run afoul of the Diamond Shoals.

In the early 1880's several shipping companies, three insurance firms, the Board of Commissioners of Pilots (New York) and many masters requested that a lightship be placed off the Diamond Shoals, that "it would be of great service in navigating along that part of the coast and largely to lessen the risk of disaster.." Congress forwarded the pleas for a lightship, through the Lighthouse Board, to the Inspector of the Fifth District who had charge of that stretch of coast. He replied he did "not deem it advisable to establish a light-ship as asked for and considered that it would be placing a light-ship in position simply to cause a continued loss of life. All gales from the south and east, which are extremely severe there, would have a tendency to cause the light-ship to break adrift, and no earthly power would prevent every soul on board from being lost on the shoals to leeward, as the sea is heavy at all times." The inspector recommended that a gas-powered lighted whistle buoy be placed off the shoals, reasoning that a buoy would survive where a lightship wouldn't, and that it would mark the edge of the shoal. The Lighthouse Board Engineer disagreed with the suggestion of a whistling buoy off Diamond Shoals. He stated, in part, .."buoys are frequently absent from their stations, and in many cases are not heard when needed." He recommended that a lighted beacon be established on the shoal.." a skeleton iron tower carrying a reservoir for compressed gas and capable of exhibiting a reliable light of suitable power, from a height of 40 or 50 feet for a period of three months." And, he asked the District Engineer to investigate the situation.

In the meantime whistling buoys were tried three times, to no avail. Each time they went adrift shortly after being placed on station. The Board theorized that heavy wave action and strong currents of the area, coupled with the sandy bottom, contributed to wearing and parting the buoy's mooring chains.

In June of 1883 the District Engineer, Major O. E. Babcock, sailed to the Diamond Shoals aboard the tender *Jessamine*. They sailed between the Inner and Outer Diamond Shoals and took extensive soundings. He found that the depth was fairly consistent at 17 feet at low water. Talking with local mariners and pilots he concluded that there was sufficient calm weather June through September to allow the construction of a lighthouse on the outer Diamond Shoal. "I am", he said in his report to the Board, "therefore of the opinion that the placing of a beacon or light-house on the



Outer Diamond itself is practicable, and though its construction will be expensive and attended with danger, I think the importance to commerce so great that the work should be done." He suggested a lighthouse at least 80 to 100 feet high be constructed and that an open pier design be utilized, upon which the tower would be built.

The Lighthouse Board Ordered that core samples be taken from the site, informal designs be solicited, and that the winning contractor would not receive any payments until (1) the structure was successfully completed, (2) the contractor had operated the lighthouse for five years and (3) that 20% of the cost be withheld for the five years and paid if the structure stood at the end of that time. This was a very unusual condition of contracting for a lighthouse, but then, the Outer Diamond Shoal is a very unusual location for a lighthouse.

In 1885 Sooysmith & Co. of New York agreed to the terms which the Board had outlined and requested permission to submit plans. After considerable correspondence the Board allowed that Mssr. Sooysmith could submit proposals for the lighthouse. The company submitted three designs and gave an estimate of between $450,000 and $500,000 as the cost for the project.

In January of 1888 Congress (Senate Bill 1283) appropriated $500,000 for the construction of a Lighthouse and fog signal on Diamond Shoal PROVIDED that the contractor selected by the Lighthouse Board be deemed "best fitted, by reason of skill, experience, possession of plant, and control by means to do the work.." This proviso flew in the face of the law which awarded, even back then, work to the lowest bidder. Treasury and a U.S. Senator questioned this proviso and the Chairman of the Lighthouse Board VADM Rowan replied that while the lowest bidder stipulation often worked to the advantage of the government, even constructing most lighthouses, "in works of a special character requiring the experience and skill of experts, and adequate plant and capital, it has worked injuriously to both the contractor and the government. He mentioned the case of Fowey Rocks lighthouse in Florida where an enterprising firm of young men got the low bid but because of a lack of experience were ruined and the government also lost because of their failure. Additionally, the unique (first of its kind) caission structure of Fourteen Foot Bank, DE was very nearly a disaster and was a success only due to the competence of the contractor..."A little less skill, a trifle less power, a slight deficiency in experience, and the work would have been a disastrous failure instead of being a gratifying success". He further stated that some business firms, without understanding the nature of the work to be done, embarrass themselves by bidding below a fair price, hoping in the case of failure to receive relief from Congress.

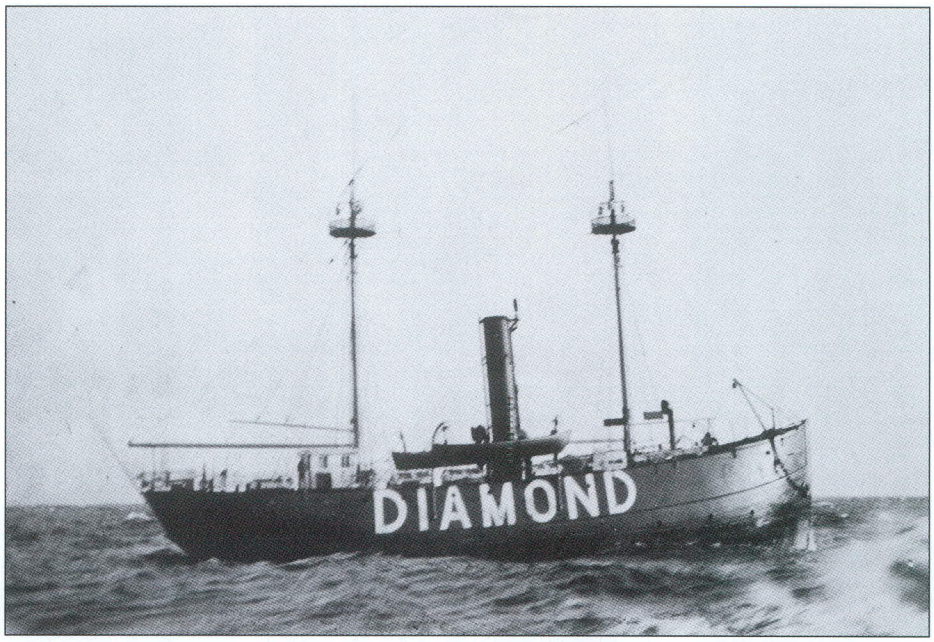
In July of 1890 the Lighthouse Board opened four bids for the project ranging in cost from $474,000 to $1,820,000. They selected the firm of Anderson and Bar of Jersey City, NJ whose bid was $485,000. Anderson and Bar proposed sinking a 54 diameter iron and concrete pier up to 124 feet below mean low water. The total height of the foundation would be 154 feet; 7 feet above the shoal and about 30 feet above the water. This massive structure would then be topped by a tower with a diameter of 45 feet at the bottom tapering to 19 feet at the top. The focal plane of the 1st Order lens was designed to be 150 feet above the water.

The contractor constructed the first 45 foot high stage of the caisson in June 1891 and on June 28 commenced towing the structure to Diamond Shoals with three powerful tugs. They arrived at Diamond Shoals on July 1 and anchored the caisson by grounding it in 22 to 25 feet of water. They quickly realized the design of perpendicular sides for the caisson was a mistake. Scour [Keep'—To wash or rub clean, as a channel, by the action of water] immediately gave the caisson a decided list, some 7½ feet out of level. And then the currents immediately started to wash the sand from beneath the structure. That night heavy seas tore it to pieces and in 3 days it had completely vanished from view. No further work was carried out after this.

In May of 1894 the District Engineer placed an iron boring frame on the Outer Shoal and the keeper of the Cape Hatteras Lighthouse was instructed to view it every day with a telescope and make monthly reports. The structure stood for the year and was then torn asunder by heavy seas, the 'shoals' had won yet again. But the Lighthouse Board wanted to try again and plans were resumed to construct a lighthouse. Bids for a steel skeleton structure were advertised, which was surprising as the Board stated in 1890 that skeleton or pile structures would not be considered. However, in response to pressure from the maritime community Congress instructed that a portion of the $500,000 authorized for the Diamond Shoal lighthouse was to be spent on the construction of a lightship and that any remaining funds were to be returned to the Treasury.

Above—LV 69. This 112 foot long lightship served on Diamond Shoals from 1897 to 1901. She was driven ashore on Aug. 18, 1899 and refloated in September. LV 69 also served on the Overfalls and Scotland stations. Ted Miles photo.

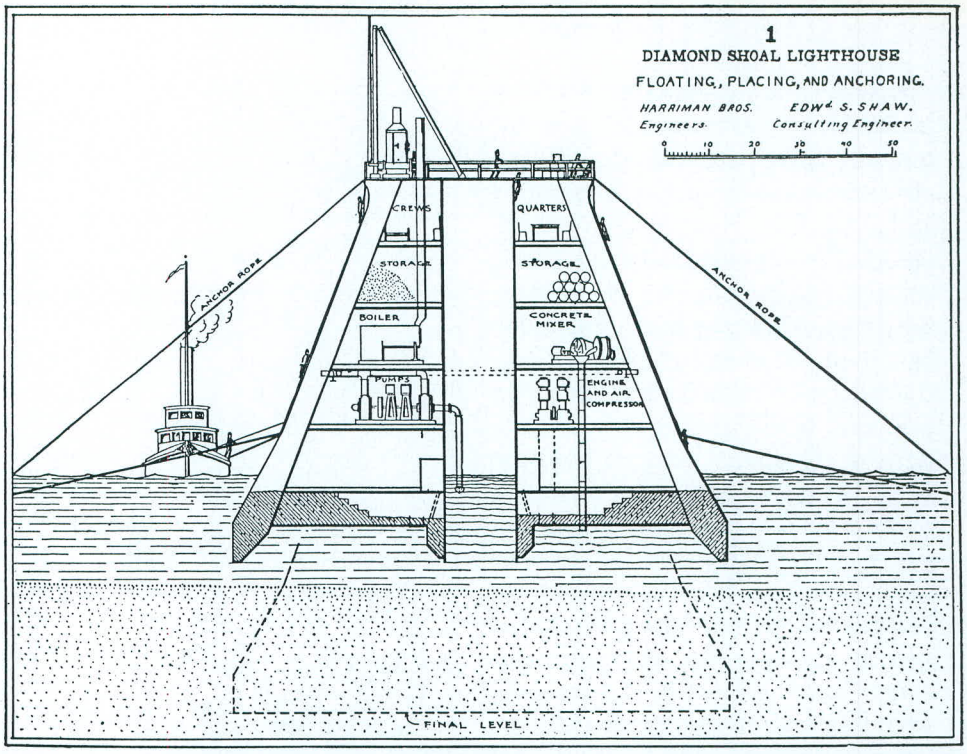
Below—The 123 foot long LV 71 on station in 1917. She was constructed in 1898 and served on Diamond Shoals from 1899 until 1918 when she was sunk by a German submarine (U-140). Official Coast Guard photograph.

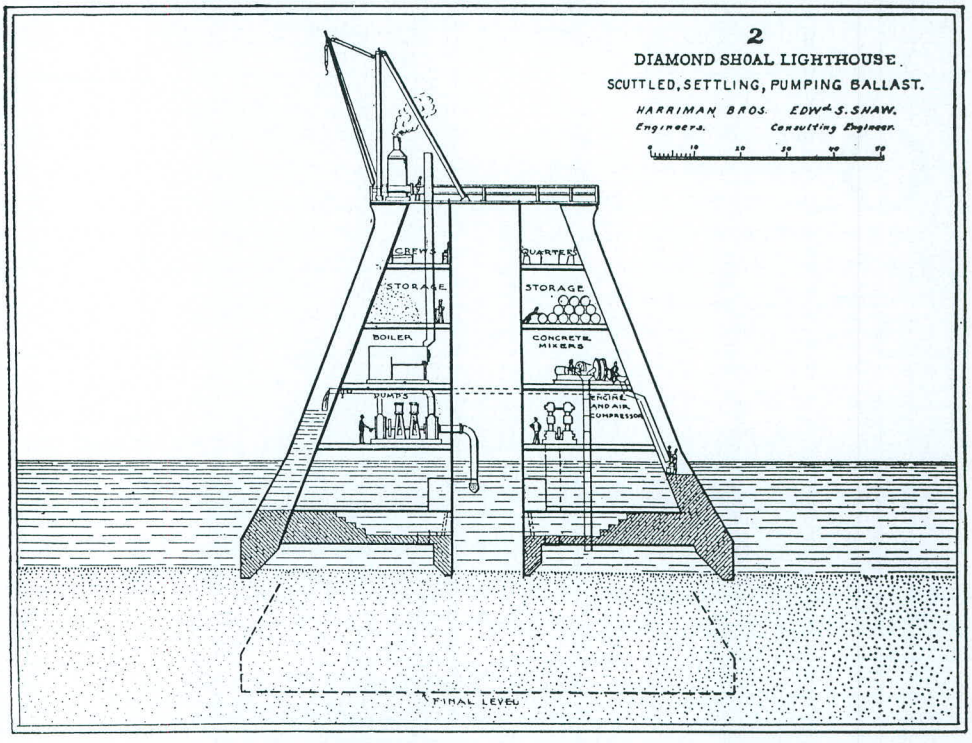


In a very short span of time in 1897 the lightship was designed, bids requested (and awarded to the lowest bidder), and the vessel completed. She was designated *No.* 69 and placed on station on 30 September. The lightship was only 112 feet in length but quite beamy at 28′ 6″. *Diamond*, as she was known, was a steam powered, single screw vessel weighing 350 tons. She was constructed of steel and wood planks and equipped with flashing electric lights on the mast heads and a chime steam whistle fog signal.

From the very beginning *No. 69* had problems; not only with the rough station she occupied but the vessel itself was less than ideal. In February 1898 the mooring chain wore a hole in the mooring buoy (that was part of the lightship moor) and the buoy sank. This buoy was replaced in March. The spar deck of the vessel leaked from the first day on station. There was no provision to prevent water from entering hawse pipes in rough weather and the berth deck was constantly wet and sometimes flooded to the extent that it was uninhabitable. Lack of insulation around the stack from the donkey boiler required that the main boiler had to be used on all occasions. From the beginning the electric lights didn't display the proper characteristic and, in fact, the entire electrical system was very poorly designed. Finally, in March 1898 *LV 71* relieved *No. 69* so that she could be brought in for repairs and eventually be converted to a lighthouse tender.

That there was a need for a lighthouse or lightship in the Diamond Shoals area is made quite evident by the numbers of vessels lightship *No. 69* logged during her first six months on station; 1,977 steamships, 3 ships, 39 barks, 16 brigs and 1,843 schooners. *LV 71* didn't exactly have a picnic on her temporary station. She ran afoul of the mooring buoy, damaging the bottom, and broke off one blade of the prop. During November 1899 she was dragged off station west-southwesterly. In a January 19, 1900 gale she was dragged 2 miles northeast of station and returned on the 25th. On February 4, she was dragged to about the same position, returning to station on the 11th. On February 21 she was again dragged to the northeast 1½ miles and when the wind shifted on February 24 she was dragged back almost to station, finally returning to station on the 27. On March 1, 13, 15 and 19 the ship was dragged up to 2½ miles north of station and again in April and May the vessel was dragged off station. This was clearly not a good location for a lightship. The Board recommended that far heavier moorings be furnished the ship prior to the next Winter. In 1901 a new, larger lightship, *LV 72*, relieved *No. 71*.





But she too had trouble maintaining station during Winter storms.

Congress approved an Act, 28 April 1904, which stated that if a Mr. Albert Eells and Associates of Boston, Mass. would build a lighthouse on Diamond Shoals, at their own cost, maintain it for one year at their own cost, then the Lighthouse Service would maintain it for four years at government expense. If, at the end of the five year period, the structure was still in substantially good condition then the government would pay Mr. Eels and Associates $590,000. In 1905 the amount of the ante was upped to $750,000.

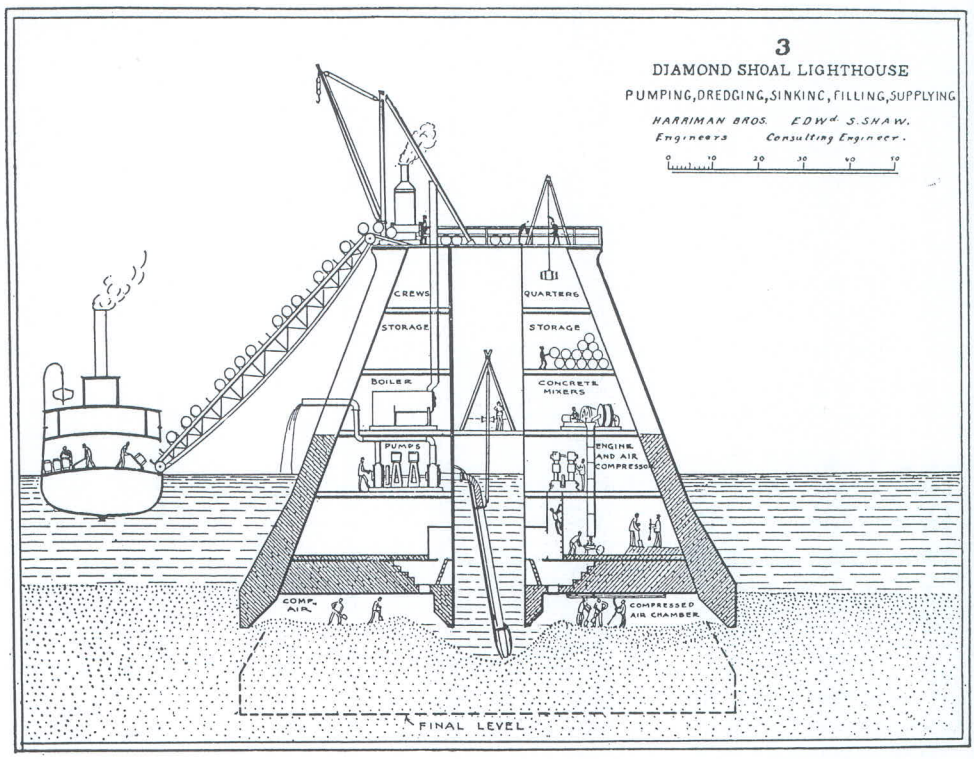
Mr. Eells was a retired sea captain and engineer of some renown. He invented a universal cold storage system and a diaphram pump used by major shipyards.

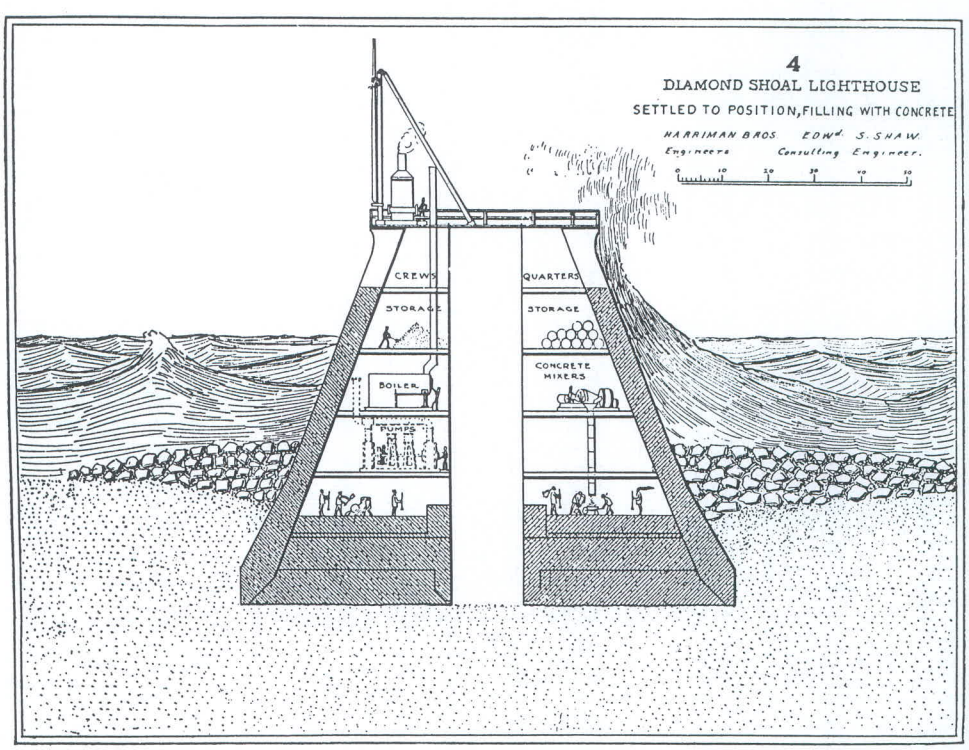
Around the turn of the century he patented a process for submarine construction which he planned to use in the construction of the Diamond Shoals lighthouse. His proposal was to construct

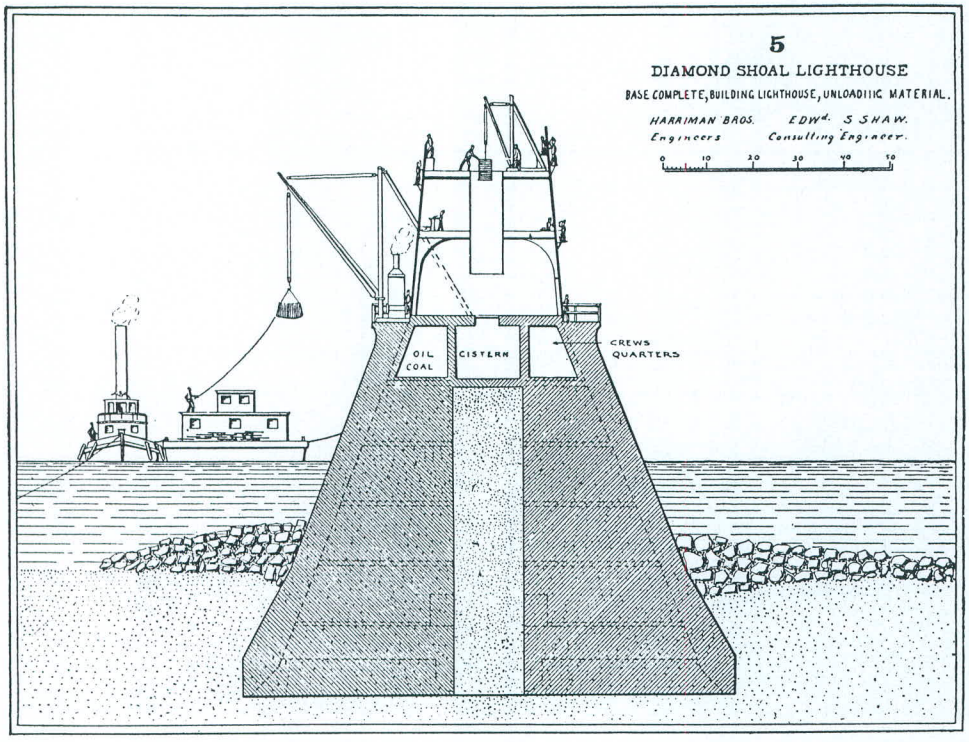
a massive cone shaped caisson 108 feet in diameter at the bottom, 50 feet at the top and 80 feet high. Double walls of plate steel would be situated six feet apart and divided into 24 water tight compartments. The estimated weight of the entire structure when finished was 27 thousand tons. Mr. Eells was determined to fight the elements with sheer mass. Once the caisson base was constructed in the ship yard the bottom spaces and portions of the spaces between the walls would be filled with cement to the extent that the floating caisson would draw 21 feet of water. He reasoned that should a storm come up while the structure was being towed he could have ballast added so there was less freeboard exposed to the wind and if the structure did ground it would ground in deeper water. Then when the storm subsided the water ballast would be pumped out and the caisson floated free.

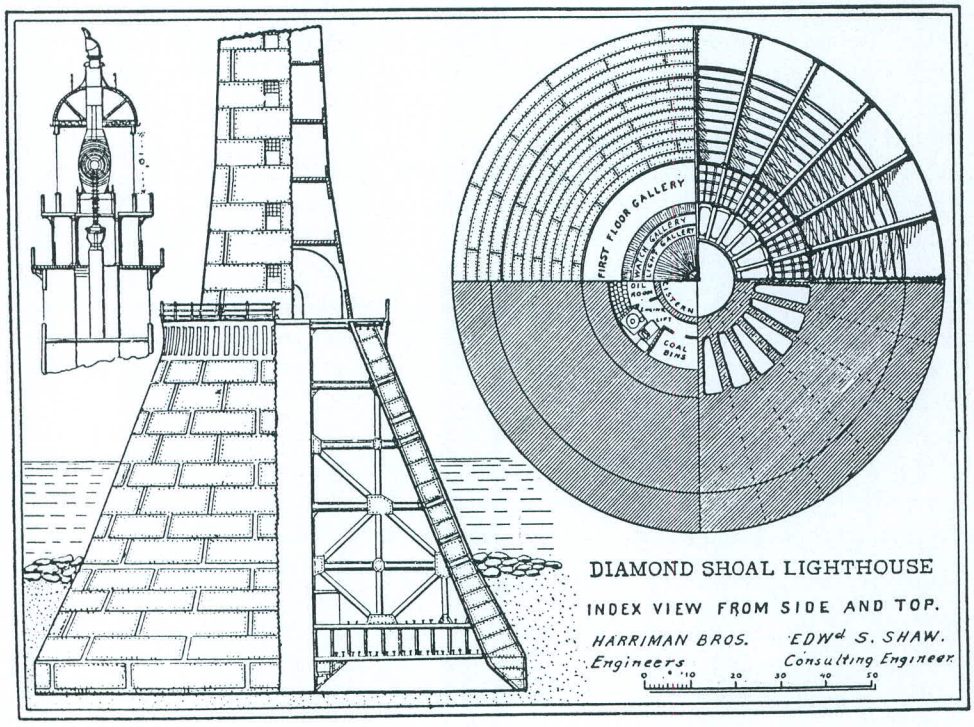
Once the caisson arrived on scene it would be sunk to the bottom and workers would begin excavating though the central shaft. Eventually the 'sand hogs' (aka the Brooklyn Bridge) would enter compressed air compartments under the caisson and continue sinking the caisson into the sand bottom by using hydraulic and water jet techniques. The sand would be forced to and up the central shaft and pumped overboard. Concurrent with this another team of workers would be mixing and filling the caisson with cement. Eventually the structure would be 25 feet below the sand bottom of the shoal and 50 feet below water. When finished the caisson would be filled with cement except for a 15,000 gallon fresh water tank and a cistern for oil. Next rip rap [stone] would be placed around the exterior of the caisson at the seabed out to 75 feet.

The next phase provided for construction of the lighthouse tower on the caisson and would be a proverbial "piece of cake." The circular steel tower was designed to have eight floors all connected by a spiral staircase. The first floor would contain three life boats and a crane to hoist them aboard the caisson. The second floor was designed for the fog signal equipment and two oil









engines. The third floor would contain the hoisting engine for the crane, two store rooms and a bedroom, the fourth level two more bedrooms, a bath and writing room (the office?), the fifth the same, the sixth floor a dining room, kitchen and pantry, the seventh a double sitting room and laundry and the eighth a lighthouse service room. Above this floor was the watch room and surmounting that, the lantern room containing a 1st Order lens with a focal plane 150 feet above the sea.

Mr. Eells' plan certainly appeared workable and the government was willing to give it a go, although admittedly without much risk. However, for some reason, he never tried to conquer Diamond Shoals. On March 3, 1905 an Act provided that "Unless said plans are approved by said Secretary prior to January first, 1906 and the construction of the proposed structure be in good faith commenced within six months after such approval, the authority granted by this act shall cease."

The period of six months expired on June 29, 1906 and the matter was forwarded to the Department of Labor and Commerce and the Attorney General who, in August of 1907, agreed. Also in that month Commerce wrote to Mr. Eells that since he had not commenced the structure "in good faith" the "authority granted in the act..has ceased." One last, and quite possibly successful, attempt to conquer Diamond Shoals was not to be. But a lightship did continue to guard mariners from the reef until it was replaced by a Texas tower type of structure in 1966. And the crews who manned the lightships that occupied that station had some rather frightening experiences through the years. The vessel was blown off station countless times, collided with, and *LV 71* was sunk by a German U-Boat in 1918.

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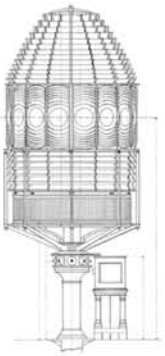

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Thomas Point Shoal Lighthouse, MD

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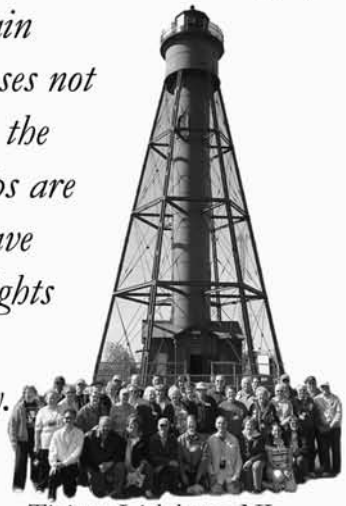

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