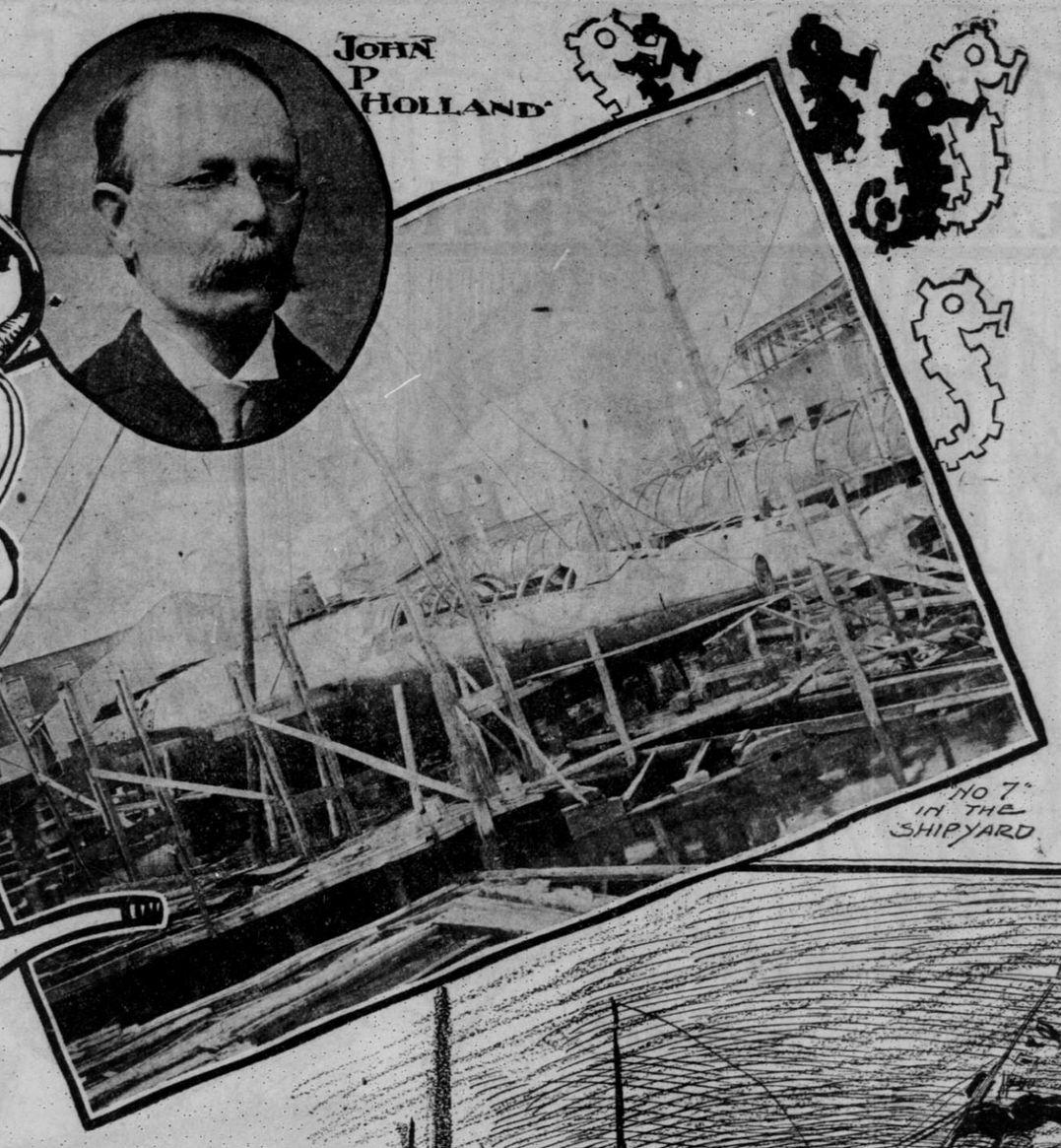
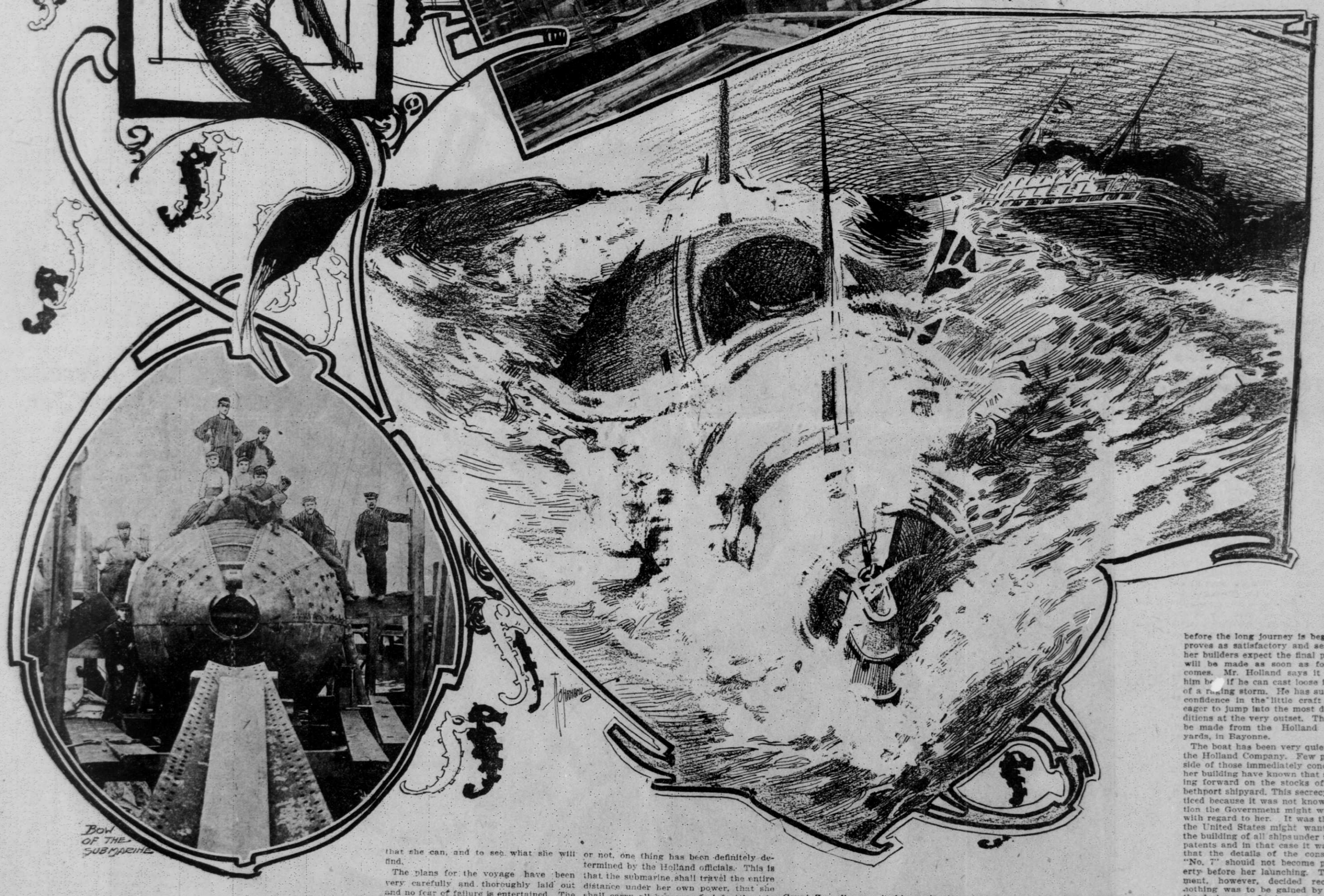
To Europe in a Submarine Boat

JOHN P HOLLAND



"NO 7" IN THE SHIPYARD



BOW OF THE SUBMARINE

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PREPARATIONS are making for the most interesting event in ocean travel since the first steamship crossed the Atlantic. A submarine boat is to be sent from America to Europe under her own power. She is the invention of John P. Holland, whose submarine torpedo-boat Holland, now the property of the United States Government, figured extensively in the recent naval maneuvers at Newport and is known for the present as "No. 7." She is now fitting out at Nixon's shipyard in Elizabethport, N. J., for the trans-Atlantic journey. For some years now submarine boats have puttered about the harbors both in this country and in Europe, but they have never ventured far from the coast. A boat of this type built by Nordenfelt made a journey of 150 miles along shore on one occasion, and this has been the long-distance record. A tour of great oceans in a submarine, it has been generally supposed, would always remain a dream of Jules Verne.

The inventor of the Holland torpedo-boat has now determined to make this dream a reality. His new boat will go to Bermuda, thence to the Fayal Islands, then to Lisbon in Portugal. This is a trip of 3496 miles—New York to Bermuda, 676 miles; Bermuda to Fayal, 1880 miles, and Fayal to Lisbon, 940 miles. Just when the trip will be made is not yet definitely determined upon, but it will probably be some time in February. The boat will wait for propitious weather. To speak of waiting for propitious weather in February sounds like an absurdity, and in the case of ordinary craft it would be, but what Mr. Holland's diver is looking for is storm, high wind and a heavy sea. A smooth sea and the absence of storm signs will be the signal for the postponement of the voyage. For this journey is to test once for all the capacity of the submarine to care for herself on a long trip, under the most unfavorable conditions.

To the lay mind such a journey will seem to smack decidedly of foolhardiness. To the minds of the men who are to travel in the submarine the proposed journey ranks with a trip on the Kaiser Wilhelm or the Deutschland. They admit they will go slower, but that is all. The voyage to Lisbon is to take sixteen day. "No. 7" will travel all the way under her own power. Her speed will be approximately nine and a half knots for the entire voyage. She will not travel at the bottom of the sea as did Verne's fantastic craft. Most of the way she will go on the surface. Occasionally, however, she will go under, and remain for thirty or forty miles, at a depth varying from thirty to sixty feet. Her inventor claims for her that she can safely go 400 feet beneath the surface and maintain herself there, resisting successfully the terrific pressure of the water. No such depths will be attempted on this trip, however, and except for purposes of scientific investigation or explorations for sunken vessels no object would be gained by diving very deep. At thirty feet beneath the surface the craft is as secure against discovery as if she were a hundred times as far down, and can pass safely beneath the keel of the greatest of ocean liners. Now and then in shallow places she will touch bottom just to show that she can, and to see what she will find.

The plans for the voyage have been very carefully and thoroughly laid out and no fear of failure is entertained. The trip is taken for a two-fold purpose. It is to demonstrate in the first place, the fallacy of the opinion still entertained in naval quarters that submarine boats cannot sustain themselves far away from a base of operation; that they are useless as offensive weapons against a country on the other side of the sea, and that their mission, if they have any at all, is for coast defense merely. The second object of the trip is to present the boat in foreign harbors to foreign governments.

Mr. Holland has the utmost confidence in the ability of "No. 7" to make the trip to Europe in safety. He himself, will be in command. Including the inventor there will be eight men aboard the little craft. Their quarters will be pretty close, but they feel certain that they will not be too close for comfort. Whenever the possibility has been discussed of navigating a submarine for a long distance it has always been asserted that it would be impossible for a crew to stand the confinement. The voyage to Lisbon is expected to determine this matter. As the projected trip is a first experiment an extra crew will be carried in a tender that is to convoy "No. 7" to guarantee the men against actual hardship. This tender will be a small tramp ship. She will keep her little consort constantly in sight if possible, so long as the latter remains on surface. But, as the stormiest period of the year is to be selected for the journey, it is more than probable that the two vessels will part company long before the end of the game. It is a pretty difficult thing to keep in sight such a small speck as "No. 7" will present, when the sea is high and the wind is battering the convoy about.

But whether the consorts lose each other or not, one thing has been definitely determined by the Holland officials. This is that the submarine shall travel the entire distance under her own power, that she shall carry all her own fuel for the trip and that she must subsist on her own provisions. No tow line is to be thrown out at any time. If it is, the trip is to be considered a failure and the experiment will be tried over again. Comparatively little submarine traveling will be done in midocean should the weather be pleasant. During storms, however, "No. 7" will remain much of the time beneath the waves, only her turret showing. This will add very much to the comfort of her crew. Should it prove desirable she may dive into the absolutely still waters below the region of wave disturbances.

"The fellows on the other ship will wish they were with us when it comes to blow," Mr. Holland said in describing his storm tactics. "While they and the other unfortunates who may be aboard on the surface, are being knocked about by the waves, we will calmly sink to where it is still and placid. A boat built on the lines of our submarine rides much more easily than surface boats. She acts like a water-soaked log when running awash. The water rolls over and off her, imparting little or no motion. The most squeamish person would not get seasick. We will be amply provisioned against all possible delays on account of weather. I cannot well conceive how anybody could be much better off or any safer against accident. I look forward to an easy journey."

"How will you rest at night?"

"In hammocks swung from the ceiling. While we will not have room enough to take exercise on a bicycle, we will be able to get our sleep about as comfortably as most sailormen, and we will not have to eat our meals standing."

The vessel will be driven by a gasoline engine of the Daimler pattern which Count Zeppelin uses in his navigation of the air. Five tons of gasoline carried in a tank will be all the fuel required to take her across at a nine and a half knot speed, and leave a safe margin. While she is traveling on the surface she will generate power for an electric engine that drives her below the water. When she dives the gasoline engine is cut off entirely. The power will be accumulated in storage batteries that weigh 70,000 pounds. The stored power will carry her under the surface for fifty miles at an eight-knot speed; then she must come up to recharge.

The cooking will be done by electricity. The arrangements for this department are such as would fill the average flat dweller with delight. When you have not an inch of space to spare for anything except necessary equipment the problem of fitting in your domestic outfit is a pretty one. In the kitchen arrangements of "No. 7" this problem has been fully met. The utensils are models of completeness and compactness. The electric range is a model. The lighting, too, will be done by electricity and such heating as may be required is similarly provided for. There will be little need for heating, however, as the quarters are so close. The ventilation will be perfect, more perfect than could possibly be found on the best appointed ocean greyhound, and this whether the boat is running on the surface with her hatch open or under water with everything battened down tight. There is an automatic arrangement for discharging the air in the ship and renewing it with a steady supply from the compressed air tanks, that are always kept filled under high pressure. As a result of this arrangement there will be none of the usual stickiness found in the atmosphere of surface ships.

Like the Holland, No. 7 is cigar-shaped. The dimensions and form of the new boat are considerably greater, however, than those of her predecessor recently turned over to the United States Government. The Holland is 54 feet 4 inches long with a diameter of 10 feet 3 inches. Her displacement on the surface is 65 tons, submerged 75 tons. Her engine has only 45 horsepower, as against 160 horsepower in the new boat. The length of No. 7 is 63 feet 4 inches; diameter 11 feet 9 inches and her interior arrangements are such that there is about twice as much room for her crew as there is for the men in the Holland. Her displacement when on the surface is 103 tons and submerged 120 tons.

Though a larger and a heavier boat than the Holland, "No. 7" is much livelier and easier to handle. She represents the extreme type in size, according to Mr. Holland. A larger vessel, he declares, will never be practicable. The Plunger, one of the earlier boats that was built according to Government demands, is over eighty feet long. Mr. Holland was forced to make her that size, but he gives it as his opinion that she will never be really valuable on this account. She is still building, having been changed again and again, according to suggestions from the Navy Department. It is considered doubtful if the Plunger will ever be placed regularly in commission as the Holland has been. She is awkward to handle even under the most favorable conditions, and she has been so loaded down inside with clumsy machinery and appliances that there is scarcely room to get about in. "No. 7," though about twenty feet shorter, has fully three times as much room.

A unique arrangement has been introduced in "No. 7" for handling the water ballast, a particularly important element in submarines. Nearly a ton of water can be ejected from the ballast tanks in three seconds as she is rising, thus allowing her turret to project above the water for the purpose of observing the enemy. Almost at the same instant the tank is again filled from the outside, so that she pops up and then down again with incredible rapidity, giving her captain in the turret just time enough to get a full view of whatever may be on the surface, and the enemy no time to sight his guns and fire.

The most striking quality possessed by "No. 7," according to shipbuilders, is that she can operate at will in fresh water as well as in salt. This no other submarine has ever been able to do. She can pass from the ocean into a river, and dive freely in either. And, what is considered even more remarkable, she can operate with equal freedom at the point where the fresh and salt water mingle. This property is due to a new arrangement of water ballast that enables her to overcome the difficulties presented in diving where the specific gravity of water changes, as it does from ocean to river, or the reverse. The value of this property in war is not hard to appreciate. It gives the new boat a much larger field of operation in such harbors as New York, where the Hudson becomes fresh a few miles up from Manhattan Island. The Holland was severely handicapped by the lack of this ability, and her failure to meet the approval of the board of inspection at a trial on April 20, 1898, was largely ascribed to the absence of the fresh and salt water navigating qualities.

Throughout this article the new boat has been referred to as "No. 7." This is at present her official designation, she being the seventh vessel built by Mr. Holland, counting from the very beginning. Before she casts loose on her great trip across the seas the little vessel is to be formally christened. She will probably be called Bushnell, in honor of the man who operated the first submarine in America. The boat will be in shipshape by the end of this month. It is the intention then to take her for a series of trial trips up and down the coast. Everything about her will be thoroughly tested before the long journey is begun. If she proves as satisfactory and seaworthy as her builders expect the final preparations will be made as soon as foul weather comes. Mr. Holland says it will please him best if he can cast loose in the teeth of a raging storm. He has such absolute confidence in the little craft that he is eager to jump into the most difficult conditions at the very outset. The start will be made from the Holland Company's yards, in Bayonne.

The boat has been very quietly built by the Holland Company. Few persons outside of those immediately concerned with her building have known that she was going forward on the stocks of the Elizabethport shipyard. This secrecy was practiced because it was not known what action the Government might want to take with regard to her. It was thought that the United States might want to control the building of all ships under the Holland patents and in that case it was desirable that the details of the construction of "No. 7" should not become public property before her launching. The Government, however, decided recently that nothing was to be gained by controlling the designs, as foreign patents on all the details have been received by the inventor. Necessarily the papers on which the patents were issued by foreign countries gave a complete description of every new device employed in "No. 7." When this fact was made plain the United States Government contented itself with ordering six of the new boats. The necessity for secrecy is therefore now done away with.

The six boats building for the Government are patterned exactly on the lines of No. 7. Four are to be constructed at Nixon's shipyards and two at the Union Iron Works in San Francisco. They are to cost $175,000 each. The Holland Company has sub-contracted for their construction and it is one of the peculiarities of the transaction that at this time no one knows exactly what their building is going to cost. The profits of Mr. Holland and his associates in the deal cannot be measured until at least two of the craft are finished. It may be $50,000 that they make on each boat or it may be only $10,000 or even less. The experience of building the other boat furnishes no guide in the matter, as heretofore there has been much experimental work. It is only now that the experiments may be said to have been completed.

Mr. Holland's success as a builder of submarine craft has not come without long years of apparently fruitless endeavor. Twenty-five years ago he submitted to the Navy Department plans for a submarine torpedo boat to be operated by one man. Secretary of the Navy Robeson referred the matter to the naval officer in command at Newport in 1875, who reported that a vessel of that type was impracticable; first, because it would not be possible to get any man to operate it; and, second, because it could not be directed under the water. The plan for that one-man boat, which seemed to the naval men of that time an impracticable dream, was the prototype of the submarine No. 7, in which Mr. Holland will soon sail for Europe.