THE IMPROVED TURRETS OF THE BATTLESHIP "TEXAS."

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The great naval battle of July 3, off Santiago, which ended in the complete destruction of Admiral Cervera's fleet, has shown in the most realistic manner possible that too great a value cannot be placed upon rapidity of fire and rapid-firing guns on board a man-of-war. The battleship "Texas" took a very important part in this battle, and the efficiency of her large guns is due chiefly to the improvements on her turrets, instigated by Lieut. F. J. Haeseler.

The "Texas" is a first rate battleship of the second class, having a displacement of 6,315 tons. She is 309 feet over all, has twin screws, triple expansion engines, and on her trial trip she had an indicated horse power of 8,610, giving a speed of 17·8 knots. Her main battery consists of two 12-inch breech-loading rifles mounted in turrets and six 6-inch B. L. Rs. which are slow fire. The turrets of the "Texas" and those of the "Maine" are on the same general plan, the port one on the "Texas" being forward, the starboard one on the "Maine," the turrets being situated in echelon. The "Texas" turrets and barbettes are of 12-inch face-hardened steel armor, while the ammunition hoists and tubes are protected by 8-inch armor. The turrets, ammunition hoists, and rammers are all worked by hydraulic power, the engines being of the three cylinder Brotherhood type. The power is furnished by four powerful hydraulic pumps, all the machinery being inside the armored redoubt.

When the "Texas" went into commission, it was impossible to load these 12-inch guns except in two positions, pointed directly ahead or directly abeam, the rammers for these two positions being outside the turrets. When firing in intermediate positions, it was necessary to train the gun off the target to load, picking the target up again after loading. This consumed much time, the interval between two shots from the same gun being at that time about seven minutes.

Lieut. Haeseler advanced the idea of carrying a light but strong telescopic rammer inside, which was to revolve with the turret, thus enabling the gun's crew to load from any position. To accomplish this it was necessary, besides securing a strong rammer that could be easily handled, to change the lead of many of the hydraulic pipes, secure a "change" or "balance pressure" valve, and to devise a means of loading inside the turret. A "balance pressure" valve that could be used as a supply, exhaust, and reversing valve was obtained by a slight modification of a "Sellers" valve, and the hydraulic plant was changed accordingly. Immediately behind the breech of the gun, when level, a strong but light telescopic rammer was balanced on trunnions, which permitted its being raised or lowered into working position by one man. The rammer is shown in our illustration to the rear of the breech of the gun.

The next problem was to devise a means of transporting the 12-inch shell, which weighs 850 pounds, from the ammunition hoist outside the turret to the breech of gun, as formerly they were hoisted into a loading position forward of the stationary rammers. A circular track carrying a small traveling car was placed entirely around the turret inside the redoubt and a grooved table was put just inside the turret opening. When a shell was sent up from the ammunition room below, it was whipped by a chain strap and differential pulley into the traveling car, run around to the turret opening by one man, and shoved into the stationary table.

Inside the turret another ammunition lift was placed, running by hydraulic power, and fixed so that in its upper position the shell table on it was level with the bore of the gun in its loading position. One man pushes the shell into the shell table; the powder, which is in four sections, is placed in stands beside the shell; the car is hoisted; the shell and powder are run home by the rammer, and the car lowered for another charge. A small loading platform, working on hinges and secured by a hook, was placed under the breech of the gun, to allow a man to wipe out the powder chamber after the gun has been fired. An interesting experiment was tried in regard to sighting the turret guns, which would have been very useful in case of accident to the regular sights. The gun is sighted by means of telescopic sights placed in hoods on each side of the breech, the officer in charge being in this hood and sighting the gun. Ordinarily, in case this hood were to be demolished by a shot, the gunners would be unable to obtain anything like an accurate aim.

Through an aperture in the turret, near the gun, a small tube was placed which was laid exactly parallel with the bore of the gun. Cross wires were fitted in the ends of this tube for sighting. Near the elevating slide, at the side of the gun, an arc was fixed firmly, graduated in yards, and a pointer attached to the slide pointed out the yards on this arc, the accuracy of the arc having been tested by the regular sights. To aim the gun by this improvised sight, the gun was trained on the target by means of the fixed tube, and the gun was elevated or lowered until the pointer on the slide showed on the arc the number of yards indicated on the range finder. The test shots with these sights gave very accurate results.

This constituted the repairs that were made on the guns in the New York navy yard, and after preliminary drills the "Texas" went out beyond Cape Henry, at Old Point, to test the work. The result was even more than expected. A mean between the intervals of five shots was one minute and fifty-five seconds, a vast improvement on the old record, while one interval was as low as eighty-five seconds. The "Texas" returned to Old Point ready for whatever was to come, and her record during the late trouble showed how completely she can be relied upon.

Formerly, for these 12-inch guns, there were but two kinds of shells, common and armor-piercing, as shrapnel are not used in the larger guns. Common shells are rather long, weigh 850 pounds, and carry a bursting charge of about 60 pounds of powder. Armor-piercing shells are the same weight, but are somewhat shorter, carrying no explosive charge. They are made of the hardest steel, with toughened point, intended, as the name indicates, to penetrate armor. The new armor-piercing shells have soft steel caps on the points, supposed to give them a greater penetrating effect. A new shell that has lately come into use, and which did good service during the late war, is known as a "semi" shell. It is a combination of the other two, of the same weight, has a hard steel head designed to penetrate light armor, and carries in addition a bursting charge of about 50 pounds. This shell is especially designed for use against armored cruisers or vessels of light protection, and is very effective. The igniting fuse for this shell is a base fuse, instead of the old nose fuse used in common shells. Common shells are intended to be used against forts, earthworks, and unprotected vessels, and were used almost entirely against the batteries before Santiago.

It could always be told when a shot struck, as a great cloud of dirt, smoke, and debris would rise in the air as a shot exploded. Several times, most notably during the engagement of the "Texas" and La Socopa battery, the guns of the Spaniards were completely buried by the earth thrown up by these shells, but the Spanish soldiers had discreetly retired to a pit on the opposite side of the hill, smoking in calm safety, to return, when the ships had retired, with mules and workmen, hauling out and remounting their guns.

While armor-piercing shells are meant to be used against protected vessels, the "semi" shells, carrying an explosive charge, were used principally during the battle, July 3. Of these shots there is a record of but two, both of which struck the "Infanta Maria Teresa" on the port quarter, entering just under the berth deck. A remarkable feature was that the holes made by these two shells were so close together that they lapped each other, giving a convincing proof that "lightning" does strike twice in the same place. These shots entered and exploded in the after torpedo handling room, and the effect, as seen by the writer, was something awful. Stanchions were cut to ribbons, frames wrenched from the side plating, and the deck beams were severely twisted. Everything in this part of the ship was wrecked, and a large jagged hole, about 4 feet square, was made in the starboard side. The effect of some of the 8-inch shots was nearly as great. The one exploding in the forward turret of the "Oquendo" alone wiped out the entire gun's crew, and put the gun out of commission.

That the large guns of the "Texas" did most efficient work is shown by the attitude of the Spanish officers, who not only feared the marksmanship of the "Texas," but were surprised to hear that she was not one of our best and most formidable ships. A bright tompion in the muzzle of the starboard 12-inch gun shows by the following inscription the service it has seen: "Santiago de Cuba," "Guantanamo," "Maria Teresa," "Viscaya," "Oquendo," "Cristobal Colon," "Pluton" and "Furor," "Reina Mercedes," "La Socopa."

The crew of the "Texas" showed their appreciation of his services by presenting Mr. Haeseler with a beautiful gold watch with the following inscription: "Presented to Lieut. F. J. Haeseler by the crew of the 'Texas,' in appreciation of his services in creating the 'Old Hoodoo' into the 'New Hero.'"

Considering the severe tests to which she has been subjected, it is safe to say that when her slow-fire 6-inch guns have been replaced by rapid-fire guns of the same caliber, there will be no more efficient vessel of her size in our entire navy than the battleship "Texas."

Special attention is invited to the front page engraving, which, in addition to showing the improved method of loading the guns, gives an excellent view of the interior construction of a modern battleship. The side plating of the ship is supposed to be cut away, giving a view of the interior from the main deck down to the handling room at the bottom of the ship. The shells are brought to the ammunition hoist in a sling, suspended from an overhead track. The cage has two platforms, the upper of which carries the powder, done up in sections, and the lower the shells. The cage is hoisted by hydraulic power, and the ammunition is transferred from it as already described. On the same deck with the magazines are the engines and boilers, one of the latter being shown in the engraving, and above them is a steel deck, 2 inches in thickness, which protects this portion of the vessel, known as the "vitals," from shell fire. Along the sides, at the water line, is shown the belt armor of 12-inch steel, and between the belt and the boiler rooms are the coal bunkers, which add their protection to that of the belt. A shell striking above the belt would have to pass through several feet of coal to reach the interior of the ship; if it struck on the belt, it would have to penetrate 12 inches of Harveyized steel and several inches of wood backing and many feet of coal before it could endanger boilers, engines, or magazines. The water itself effectually prevents the entrance of shell below the water line.

A New Gun Camera.

A new gun camera, probably the finest ever built, is being constructed in Chicago by William Gaertner for the Smithsonian Institution, at Washington. The specifications required that the instrument should be capable of making a successful exposure in one six-hundredth of a second. It is hoped that this speed will be increased so that a good negative may be obtained by an exposure of only a thousandth of a second. The principal purpose for which this camera was designed is to serve the photographing of aerodromes, with which Prof. S. P. Langley, secretary of the Smithsonian Institution, is conducting elaborate scientific experiments in an attempt at the solution of the problem of aerial flight. The instrument is provided with a delicate measuring apparatus, by which the precise angle at which the camera is tilted at the moment of exposure is known to the operator and is also photographed on the plate. This device will enable scientists to determine, under given conditions, the exact location and elevation of the object photographed.

Motor Carriage Contest at Liverpool.

A motor carriage competition will be begun at Liverpool on the morning of July 31, and the tests will conclude on the evening of August 2. Trial runs will be made from Liverpool, over a distance of from 30 to 40 miles. There will be four classes of vehicles eligible, the minimum loads being 2 tons, 3½ tons, 5 tons, and 6 tons, the long ton being reckoned. The vehicles must be propelled by mechanical power alone, but there will be no restrictions as to the source of power or the nature of the agents used. The hope has been officially expressed that vehicles from the United States will take part in the competition. Interested parties can secure details of conditions, regulations, etc., by addressing E. Shrapnell Smith, Honorary Secretary of the Self-Propelled Traffic Association, Royal Institution, Liverpool, England.

An Ocean Line Pigeon Service.

The Compagnie Generale Transatlantique, better known as the French line, proposes to develop its carrier pigeon service, following the experiments which were carried out on board the "Bretagne" a few months ago. The birds will be trained at Havre and New York. The vessels that go outward-bound from Havre will release pigeons after passing the Scilly Islands and when approaching New York. It is believed that in the last case the birds will give notice of their arrival some twelve hours before the vessel is observed at the Fire Island station. The service will begin during March, and it is assumed that when it is fully developed, communication between the land and the steamers of the company will be interrupted for less than five days.

A New Record at the Blue Hill Observatory.

The world's record for kite flying was broken at the Blue Hill Observatory, whose work we have so recently illustrated. On February 28 an elevation of 12,507 feet above the sea level was obtained by the highest of a string of tandem kites. This is 383 feet higher than the preceding best record, made at the same place on August 26. The flight was begun at 3:40 P. M. and the temperature at the surface was 40 degrees, and the wind was blowing at the rate of seventeen miles an hour. At the highest level the temperature was 12 degrees and the wind velocity fifty miles an hour. The combined kites had an area of 205 square feet and weighed 26 pounds, while the weight of the wire was 76 pounds. A series of five high flights were made on successive days, Sunday excepted. The average height reached was 10,300 feet, or nearly two miles.

A Large Timber Ocean Cradle.

An immense timber cradle has been under construction at Seattle, Washington, during the past three months, and the last section of the odd-looking craft was launched on March 20, and will be placed in position to receive the first cargo in a few days. It is thought that the cradle will have a capacity of 3,000,000 feet of lumber. Many lumber shippers are afraid the craft will never reach San Francisco, its destination.

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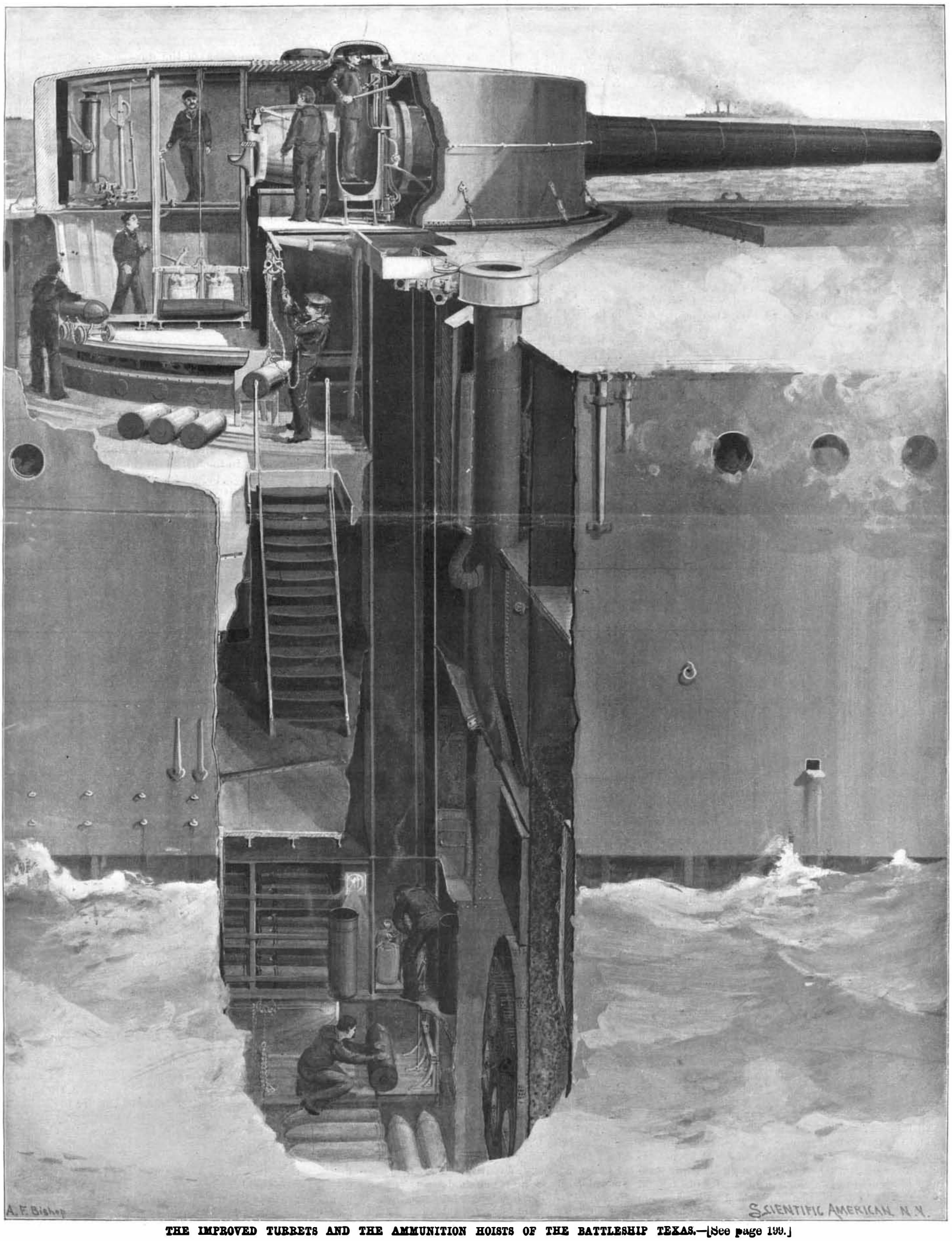

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