

**THE SPANISH TORPEDO-BOAT DESTROYER "TERROR."**

Persistent reports of conflicting nature are being circulated regarding the Spanish torpedo-boat destroyer "Terror," to the effect she has been destroyed by the United States fleet off Santiago de Cuba. Though these reports lack verification, a description of the craft in question may be of interest.

The "Terror" and her sister ship "Furor" were contracted for by the Spanish government, and built near Glasgow, Scotland, by the Clydebank Engineering and Shipbuilding Company (Limited), during 1896 and 1897; and both were supposed to represent the most advanced type of naval construction and armament in their class. Though laid down on the general lines adopted by the Admiralty Board of the British navy, these craft differed slightly therefrom, chiefly in matters relating to the accommodation of officers and crew, and specially as regards service in tropical seas. Impermeability to artillery is little considered in torpedo-boat destroyers, inasmuch as they are supposed to rely upon a low freeboard, their speed and ability to maneuver quickly to avoid the fire of an enemy, and upon an armament of rapid-fire guns to resist attempts at boarding.

The "Terror" is (or was) 220 feet long and 22 feet beam, over a moulded depth of 13 feet, with a total (loaded) displacement of 380 tons, and driven by triple-bladed twin screws, each with four-cylinder triple expansion vertical engines. Her contract called for a speed of 21.5 and 28 knots, respectively, under natural and forced draught, and on her trial trip she is reported to have exceeded the former by a full knot and the latter by one-half knot, on both occasions with a load of 75 tons; one of her sister craft sustained continuously, for two

boiler is controlled by a special automatic feed regulating arrangement which keeps the water at a steady level in the boiler. For the auxiliary system a similar feed pump is placed in each boiler room, and each pump is connected by separate pipes with the reserve fresh water tank, the hot well tank and the sea, and discharges direct to the boilers. The pump in the after boiler room also discharges to the deck and there serves the purposes of a fire pump.

The main steam pipes are of galvanized steel. An independent pipe extends between each boiler room and one set of engines, and each pipe is fitted with a stop valve and steam separator on the engine room bulkhead, thereby insuring dry steam in the engine. There is also a connecting pipe between the main steam pipe and an equilibrium valve at each high pressure cylinder. An independent auxiliary steam pipe supplies all the auxiliary engines, fans, capstans, steam steering gear, etc., except the main feed pumps, and the exhaust steam is led by a system of pipes to either of the main condensers.

The four cylinders of each set of engines are separate castings, but bolted together and transversely stayed, and likewise stayed to the gusset plates in the wings connecting the frames and deck beams; also a pair of struts extend from each of the high pressure cylinders to gusset plates between the decks and forward bulkhead of the engine room, and like ties secure the low pressure cylinders. The cylinder bottoms, each a separate casting, are bolted to the cylinders, and they, together with the cylinder covers, and top and bottom covers of the valve casings, are of cast steel. Pistons of forged steel, turned throughout and fitted with Perkins metal rings; piston and connecting rods hollow and of wrought steel; crosshead pins of casehardened

**Theater Sickness.**

Under the name of mal de théâtre, we find in the Progrès médical, says The New York Medical Journal, an account of an affection often witnessed by physicians in theaters, according to the writer. It is manifested by loss of consciousness, faintness and even syncope. It generally occurs in persons who have dined hastily in a restaurant and reached the theater overheated. Pregnant young women are particularly disposed to it. The only treatment required is to loosen the clothing, lay the patient down, expose the face to fresh air, bathe the temples with a little cold water or cologne, and apply smelling salts. The patient should not be allowed to stand or sit up until the attack is thoroughly over, that is, for ten or fifteen minutes, and then he had better not remain for the rest of the performance, but go home.

**Prehistoric Dentistry.**

George Byron Gordon, the explorer, contributes an article on "The Mysterious City of Honduras" to the January Century. The article gives an account of recent discoveries at Copan. Mr. Gordon says:

"No regular burying place has yet been found at Copan, but a number of isolated tombs have been explored. The location of these was strange and unexpected—beneath the pavement of courtyards and under the foundations of houses. They consist of small chambers of very excellent masonry, roofed sometimes by means of the horizontal arch and sometimes by means of slabs of stone resting on the top of the vertical walls. In these tombs one, and sometimes two interments had been made. The bodies had been laid at full length upon the floor. The cerements had long since mouldered away, and the skeletons themselves

Fig 2

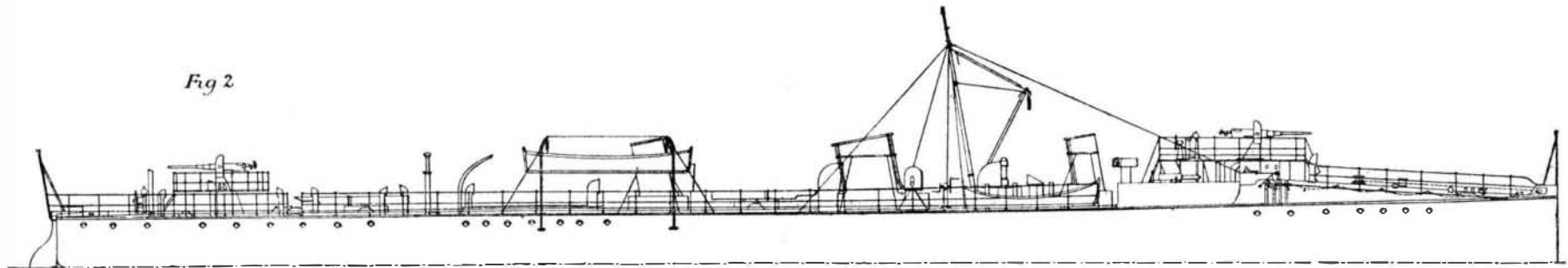


Fig 3. Upper Deck

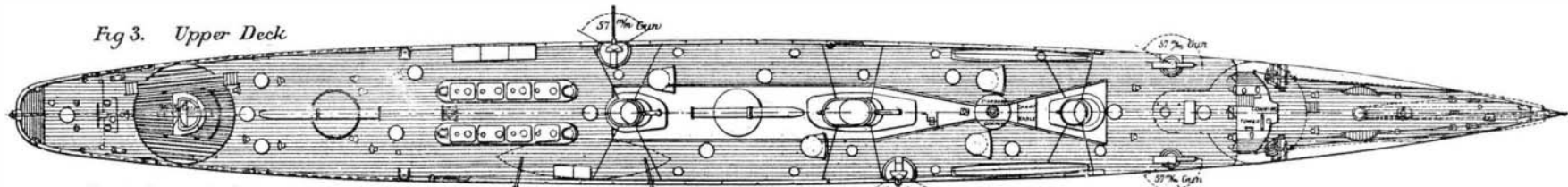
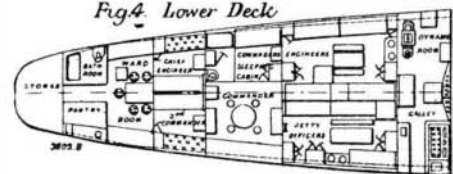
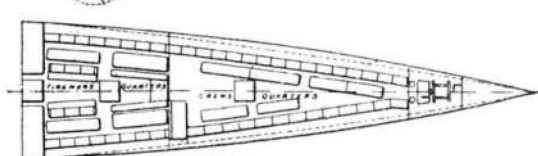
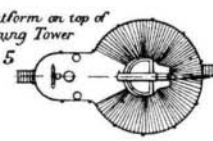


Fig 4. Lower Deck



Gun Platform on top of Conning Tower Fig 5



**THE SPANISH TORPEDO-BOAT DESTROYER "TERROR."**

hours, under forced draught, a speed of 30.02 knots—approximately 34.2 miles.

The armament consists of two 14-pounder quick-firing guns, fore and aft, the former mounted on the conning tower; two 6-pounder broadside guns of like type; and two 37-millimeter automatic, quick-firing guns mounted, respectively, on starboard and port bow; all supplied by the Maxim-Nordenfledt Gun and Ammunition Company (Limited), and representing the latest advance in naval artillery; in fact, the rapidity of fire, especially with the automatic guns, which are loaded and fired through the agency of the recoil, is described as a "hail of iron missiles;" also two torpedo tubes on the Schwartzkopf system, 14 inches in diameter, mounted on the upper deck so as to fire on either side. Four torpedoes are carried, along with complete sets of air compression machinery.

The steam power of these vessels is derived from four improved Normand boilers, with galvanized steel tubes, situated fore and aft in two separate watertight compartments. The two distal furnaces discharge each into its own funnel, but the midship pair have one large funnel in common. Forced draught is on the closed stokehole system, the air being supplied by two single-breasted fans in each firehold, placed one on either side of the bunker bulkheads, the air being admitted to them by large cowls directly overhead; the fan engines are of the open vertical type. The boiler feed consists of a main and auxiliary system of pumps and pipes, separate and entirely independent of each other. The main system consists of two of Weir's special feed pumps at the forward end of the engine room, each drawing from the hot well tank through a Harris patent feed water filter, and discharging either to the boilers in one compartment direct, or through a couple of Weir's feed water heaters, situate on the forward engine room bulkhead between the pumps. The feed water discharge to each

steel fixed in forks of the connecting rod; piston head, piston rod and piston rod guide, one complete forging, the latter with machined recesses filled with white metal on the "ahead" side; the "ahead" guide faces of cast iron, with water circulation at back; "astern" facings of bronze.

The bed plates also are of cast steel, each consisting of two angle bar shaped castings extending the whole length of the engine and resting on longitudinal frames extending between the engine room bulkheads. The main bearing frames extend between, at right angles, being checked into and secured to these castings, as well as to the floor of the vessel, by fitted bolts. The crankshaft and pins, and thrust and propeller shafts are hollow and of steel. The high pressure and intermediate pressure cranks are arranged opposite to one another, and each pair forged in one piece; balance weights appear on the crank webs in order to reduce the vibrations to a minimum.

A large evaporator is situated amidships on the after engine room bulkhead, with a capacity of 3,150 gallons per day of fresh water, beside which is a distilling condenser, capable of supplying 560 gallons daily of pure aerated fresh water, chiefly used for ship purposes, the remainder of the vapor going to the main condensers to serve as make-up feed. A separate engine, with pumps, is also fitted for maintaining the water level in the evaporators, circulating the condensing sea water and pumping the drinking water into the ship's tanks. An auxiliary air pump is fitted to each of the circulating pumps, and is connected to the bottom of the main condensers, discharging to the hot well tank. On the after engine room bulkhead there is also a duplex bilge pump, for clearing out the bilges of the engine and boiler rooms, and ejectors are fitted to each compartment, so that, in case of excessive flooding, the water may be rapidly got rid of. For the engraving of the engines we are indebted to London Engineering,

were in a crumbling condition and give little knowledge of the physical characteristics of the people; but one fact of surpassing interest came to light concerning their private lives, namely, the custom of adorning the front teeth with gems inlaid in the enamel, and by filling. Although not all of the sets found have been treated in this way, there are enough to show that the practice was general, at least among the upper classes; for all the tombs opened, from their associations with prominent houses, seemed to have belonged to people of rank and fortune. The stone used in the inlaying was a bright green jadeite. A circular cavity about one-sixteenth of an inch in diameter was drilled in the enamel of each of the two front teeth of the upper row, and inlaid with a little disk of jadeite cut to a perfect fit, and secured by means of a bright red cement."

**The Current Supplement.**

The current SUPPLEMENT, No. 1172, contains a number of articles of great interest. The subject of the front page engravings are the guns made by Messrs. Vickers' Sons & Maxim. They are regarded as a very important type of modern English guns: 3-inch, 6-inch and 12-inch guns are illustrated. "Three-Colored Photographic Printing" is an article by Captain W. De W. Abney. Several novel types of acetylene gas generators are also shown. "Patents" is the subject of a paper by James W. See, which will be presented at the Niagara Falls meeting of the American Society of Mechanical Engineers. "The Battle of Manila" is the subject of an illustrated article showing one of the Spanish cruisers destroyed by Admiral Dewey and also a portrait of Admiral Montojo. "Pests and Poisons Peculiar to Cuba and the Philippines" is an interesting article by Dr. Archie Stockwell. "The Development of Central Stations" is an interesting address by Mr. Samuel Insull, the first installment of which is published in the current SUPPLEMENT.

# SCIENTIFIC AMERICAN

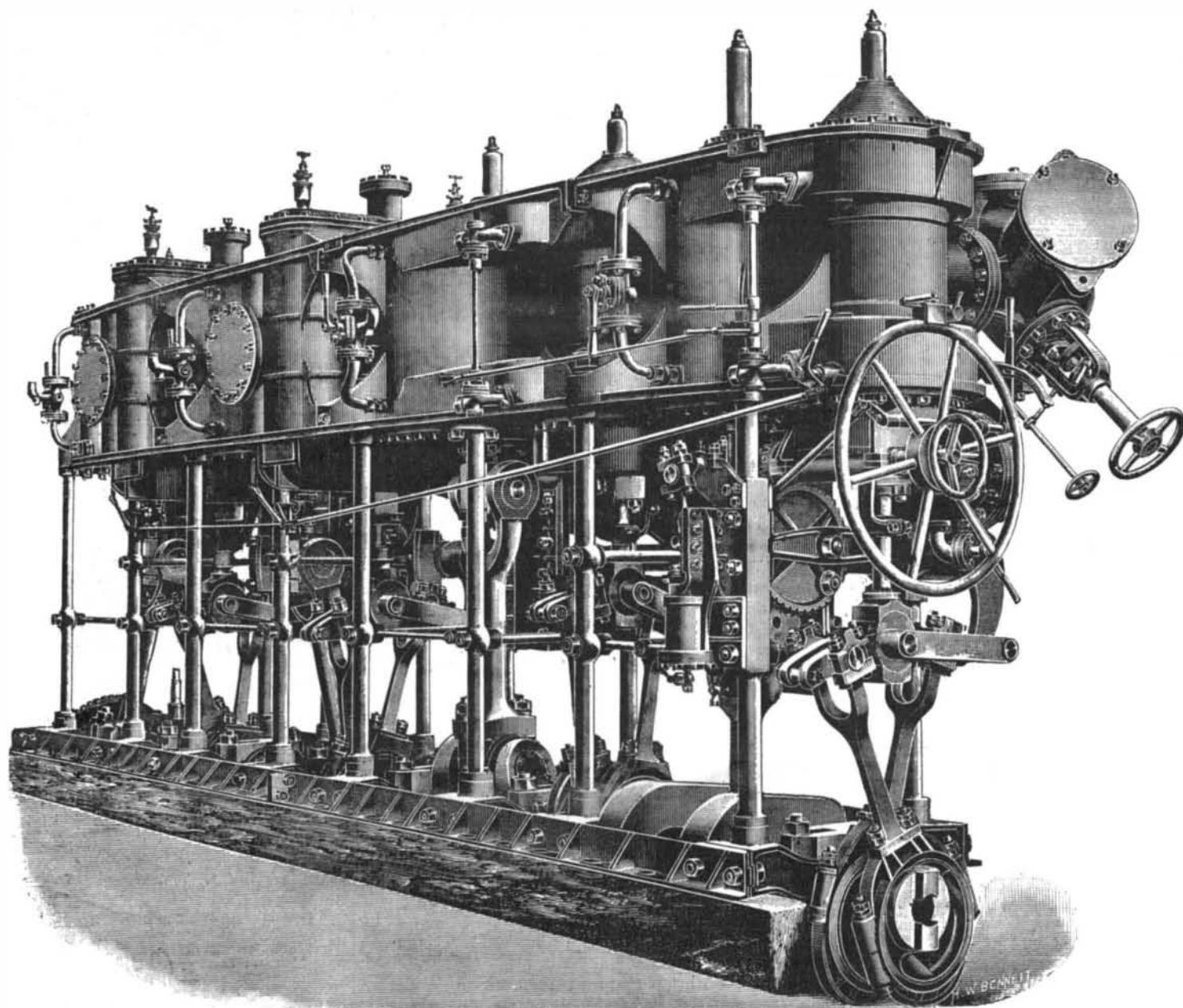
[Entered at the Post Office of New York, N. Y., as Second Class Matter. Copyright, 1898, by Munn & Co.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS CHEMISTRY, AND MANUFACTURES.

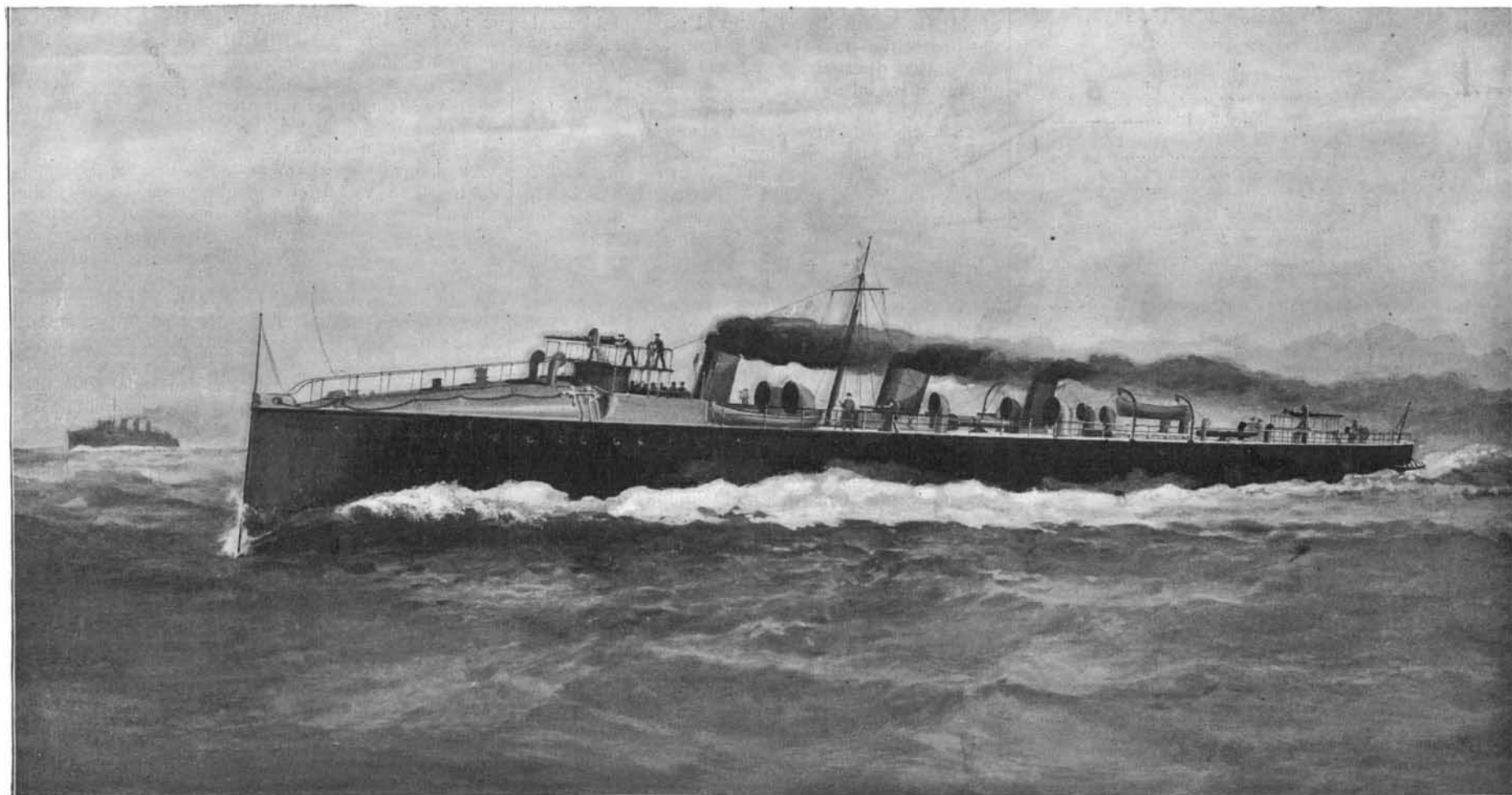
Vol. LXXVIII.—No. 25.  
ESTABLISHED 1845.

NEW YORK, JUNE 18, 1898.

[\$3.00 A YEAR.  
WEEKLY.]



ENGINES OF THE SPANISH TORPEDO-BOAT DESTROYER "TERROR."



SPANISH TORPEDO-BOAT DESTROYER 'TERROR.—[See page 391.]