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## THE ITALIAN IRONCLAD DANDOLO.

The new twin-screw, double-turret vessel Dandolo, belonging to the Royal Italian Navy, completed, not long ago, the trials of the machinery previous to joining the squadron in the Mediterranean. Excepting the omission of the internal torpedo deck, she resembles the sister ship Duilio, in her general arrangement, but she has considerably surpassed her in speed. The Dandolo was built at the Royal Naval Arsenal at Spezia, under the supervision of Director Borghi, at whose suggestion the whole of the bow plating is worked flush, instead of the plates overlapping as usual. The length of the vessel is 337 ft. 8 in.; the breadth 62 ft. 3½ in.; the mean draught at the trials with armament on board was 28 ft. 9 in.; giving a total displacement of 11,225 tons. The battery is heavily armored, and is placed in the middle of the vessel; the two turrets rise above the weather deck, and are placed diagonally in the battery, so as to enable all four guns to be fired fore and aft. The armor of the turrets is impervious to all except the heaviest modern artillery. Each turret contains two 100-ton Armstrong guns made at Elswick, having a bore 17.72 inches, throwing a shot 2,018 lb. with a maximum of 511 lb. of powder, the ordinary charge being 355 lb. The turrets and guns are moved and worked by a complete system of hydraulic gear made at Elswick. The loading is also done by the same means, the rammers being below the weather deck and arranged to enter the gun when the muzzles are depressed for the purpose. Between the turrets is situated the mast, which really assumes the function of a lookout tower, as there are no sails.

The vessel is fitted with Forrester's steam steering gear,

as well as very powerful hand steering gear, and has a beautiful self acting arrangement, designed and fitted by the Italian constructors for checking and holding the tiller; in case of the chains breaking the tiller would lock itself amidships and remain at rest till the new chain was reeved.

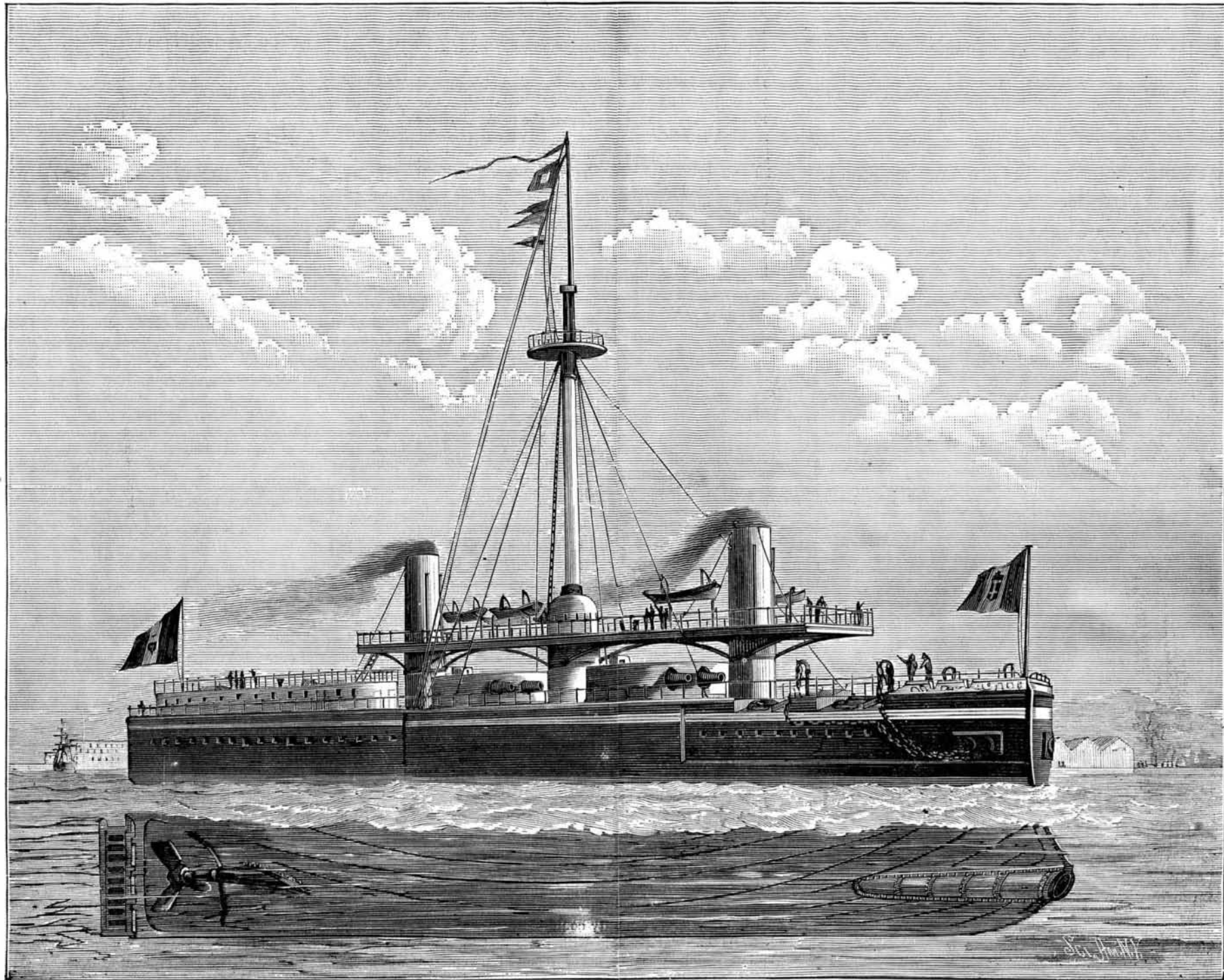
The Dandolo carries four large steam launches, and eight other boats, all hung upon hinged davits, which are worked from the steam capstan, and which will hoist them right in board. The Dandolo is propelled by twin screws, worked by two independent pairs of engines, which were contracted to indicate a maximum power of 7,500 horses. These engines, together with the pumping and blowing engines, were constructed by Messrs. Maudslay, Sons & Field, of London. They are the first compound engines which were ordered for the Royal Italian Marine, though they have been awaiting the completion of the ship at Spezia since 1876, when they were brought out in the royal transport Europa. Each set of engines is placed in a separate water-tight compartment, one at each side of the vessel; instead of being side by side they are situated one in advance of the other, the alternate spaces being occupied by the magazines, which are placed immediately below the turrets. Each pair of engines has one high pressure cylinder, 64 in. in diameter, and one low pressure, 120 in. diameter, with a stroke of 4 ft. Steam of 65 lb. pressure is supplied by eight large oval and double-ended boilers, having 32 furnaces in all. Four boilers are placed forward of the engines, and the other four aft, but each pair of boilers is contained in a separate water-tight compartment. The chimneys, which are ample in size and height, are built of one-inch plate from the main

deck to the flying deck above the turrets, so as to enable them to withstand the great shock produced by the discharge of the guns.

A very perfect system of fans and ventilating pipes has been carried out, so that the whole of the cabins and even the engine room are kept perfectly sweet and fresh. There is also another arrangement for ventilation very closely resembling in principle the furnace system of ventilation in a mine.

On the 25th of May the Dandolo proceeded to sea for her first official trial, under the command of Commandante E. Acton, who was accompanied by Admirals Martin-Franklin and Caimi. The run to Genoa and back was accomplished without stopping in 6 hours and 28 minutes, with a mean indicated horse power of nearly 7,200, and a maximum of 7,415 horses, and the speed obtained was 15½ knots, with a consumption of 51¼ tons of coal. The main object of the run was to ascertain the consumption of fuel on a prolonged full-power run. On the 29th of May the vessel was taken on the measured knot trial, when a speed of 15.55 knots was obtained with 8,050 horse-power. Our engraving is from *La Ilustración Española*.

AMONG the instruments described during the late meeting of the British Association was one exhibited by Sir F. Bramwell, employed for ascertaining the velocity of trains and the efficiency of brakes. With this apparatus it was found that a train weighing 125 tons ran 5 miles 5 yards after steam was shut off while traveling at a speed of 45 miles an hour. The line was level and the day calm.



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